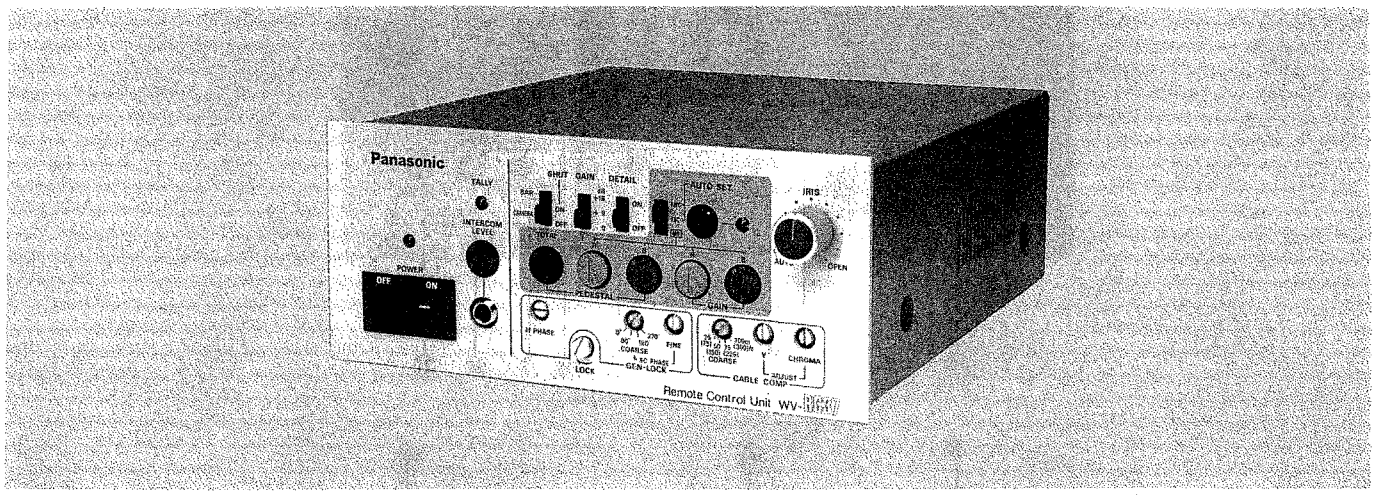
Service Manual

Remote Control Unit

WV-RC37



SPECIFICATIONS

Power Source:	WV-RC37/A, WV-RC37/B: 240V AC, 50 Hz, 75W WV-RC37/G: 220V AC, 50 Hz, 75W
Video Input:	1.0V p-p composite Y/75 ohms and 0.3V p-p-burst-level chrominance/75 ohms (32-pin camera connector)
Video Output:	1.0V p-p PAL composite/75 ohms x 2 (BNC connectors)
S-VHS Video Output:	1.0V p-p composite Y/75 ohms and 0.3V p-p-burst-level chrominance/75 ohms (4-pin connector)
Gen-Lock Input:	1.0V p-p PAL composite or black burst signal/75 ohms or Hi-Z looping through x 1 (BNC connectors)
Subcarrier Phase for Gen-Lock:	Adjustable more than 360°
Horizontal Phase for Gen-Lock:	Adjustable from -0.1μ sec to $+3.0\mu$ sec
Aux (Lineview) Input:	1.0V p-p PAL composite/75 ohms or Hi-Z looping through x 1 (BNC connectors)
Maximum Studio Cable Length:	100m (300 ft) with cable length compensator
Tally & Intercom:	4-pin connector
Switches:	Power, High Gain Selection, Colour Bar/Camera Selection & shutter ON/OFF, Auto/Manual Selection, Auto Set, Detail ON/OFF, Cable Length Compensation, Subcarrier Phase Coarse
Controls:	R and B gain, R and B Pedestal, Total Pedestal, Subcarrier Phase Fine, Horizontal Phase, Luminance Gain Fine, Chroma Gain Fine, Intercom Level, Lens Iris
Ambient Operating Temperature:	−5°C - +45°C
Ambient Operating Humidity:	30% - 90%
Dimensions (including knobs & connectors):	209 (W) x 90 (H) x 281 (D) mm
Weight:	4.3 kg

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

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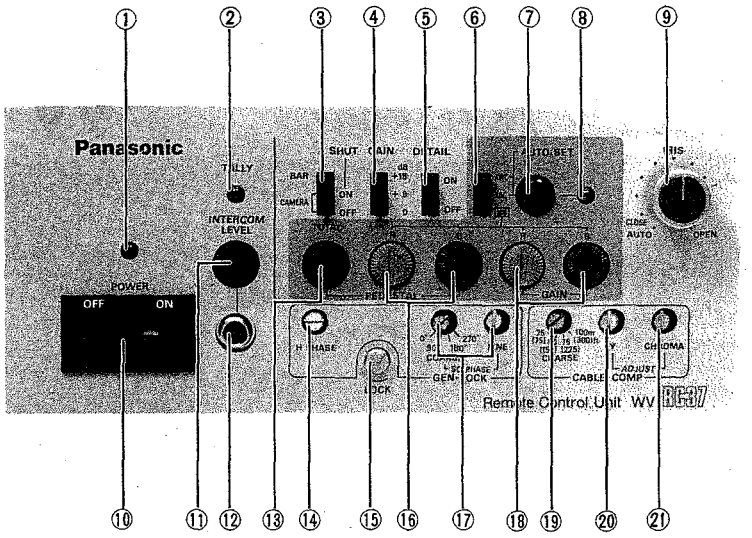
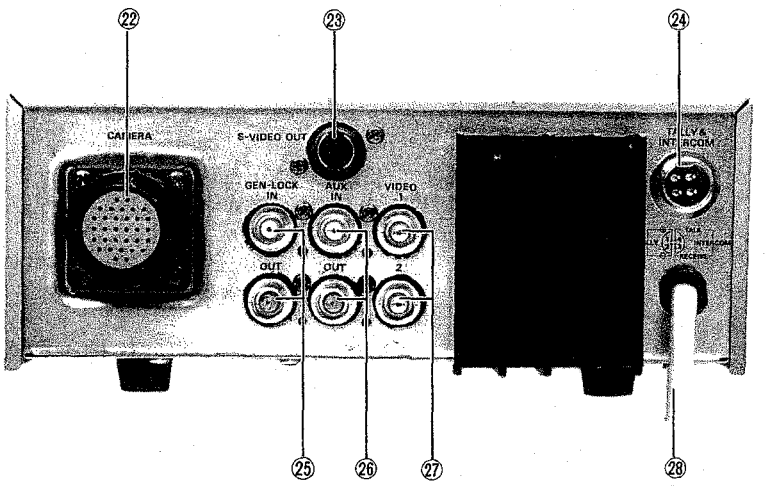
MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS





1 Power Indicator
This indicator lights up whenever the unit is operated.

2 Tally Indicator (TALLY)
When RCU is used in conjunction with a special effects generator, the tally indicator on the RCU informs to the RCU operator and others concerned that the camera system is actually recording the scene.

3 Color Bar/Camera Selection & Shutter ON/OFF Switch (BAR/CAMERA, ON/OFF)
When used in a system, this switch can select the camera mode or color bar mode regardless of the Selection Switch on the camera. This switch also switches ON/OFF the shutter operation.

BAR:
The color bar is provided from the Video Output Connectors (28) on the RCU.

CAMERA, ON:
The camera is in operating condition after necessary adjustments and the electronic shutter mode is engaged for blurfree recording of high speed action.

CAMERA, OFF:
The camera is in normal operating condition with standard shutter speeds.

Note:
The WV-F200A camera does not feature the electronic shutter.

4 High Gain Selection Switch (0/+9/+18dB)
Normally set this switch to the 0dB position. Positions +9dB and +18 dB increase the video output amplitude for dark scenes and are equivalent to opening the lens iris 1.5 or 3 F- stops, respectively.

5 Detail ON/OFF Switch (DETAIL ON/ OFF)
When set to ON, the edges of the objects in the picture are enhanced and a sharp picture is reproduced. The sharpness of the picture for WV-F200A and WV-F300 can be set by the Detail Level Selection Switch on the camera.
A softer picture can be obtained by setting this switch to OFF.
Normally this switch should be set to the ON position.

6 Auto/Manual Selection Switch (AWC/ABC/MN)
This switch is used to select the white balance and black balance modes as follows:

AWC:	The white balance can be set automatically by pressing the Auto Set Switch (7).
ABC:	The black balance can be set automatically by pressing the Auto Set Switch (7).
MN:	The white balance and black balance can be adjusted by the Red and Blue Gain Controls (19) and the Red and Blue Pedestal Controls (16).

7 Auto Set Switch (AUTO SET)
This switch sets the white balance or black balance automatically according to the position of the Auto/Manual Selection switch (6).

8 Auto Warning Indicator (Green)
This indicator blinks while the white balance or black balance is being automatically set. It goes out once the white and black balance have been correctly set.
This indicator lights when the white or black balance is set improperly. In this case, carry out the automatic setting procedure for white and/or black balance.

9 Lens Iris Control (IRIS, AUTO-CLOSE/OPEN)
This control is used to set the lens iris of the auto iris servo control zoom lens.
AUTO:
The iris level of the zoom lens is controlled automatically.
CLOSE/OPEN:
The iris level of the zoom lens can be manually controlled by turning this control.
Note:
1. The Iris Control Selection switch on the lens should be set to the A (Auto) position to enable control of the lens iris from the RCU. If the lens has REM (Remote) position, set the switch to the REM (Remote) position.
2. As the iris level of the zoom lens WV-LZ70/12 can not be remotely controlled, set this control to the AUTO position.

10 Power Switch (POWER ON/OFF)
This switch turns on and off the power to the RCU.

11 Intercom Level Control (INTERCOM LEVEL)
Use this control to freely adjust the volume level in the headset connected to the Intercom Jack (12).

12 Intercom Jack
This jack is used for communication between the camera operator and RCU operator in a system configuration with a Special Effects Generator.

13 Total Pedestal Level Control (TOTAL PEDESTAL)
This control can adjust the pedestal level of the video signal (luminance) for matching the black level between two or more cameras in a system. Turn this control clockwise to increase the pedestal level, and counterclockwise to decrease the level.

14 Horizontal Phase Control for Gen-lock (H PHASE)
The horizontal phase of the camera signal can be adjusted to match the horizontal phase of the signal at the Gen-lock Input connector (25).

15 Lock Screw (LOCK)
When the RCU is mounted onto the Rack Mount WV-RM37, turn this screw to lock the RCU firmly on the frame.

16 Red and Blue Pedestal Controls (R & B PEDESTAL)
The black balance can be set manually by these controls when the Auto/Manual Selection switch (6) is set to the MN (Manual) position. Turn these controls clockwise to increase the Red and Blue pedestal levels, and counterclockwise to decrease the levels.

17 Subcarrier Phase Coarse and Fine Controls (SC PHASE COARSE/FINE)
These controls allow adjustment of the camera signal subcarrier phase from 0° to 360°, to match the phase with that of the burst signal at the Gen-lock Input Connector (25) in a system configuration.
The COARSE control adjusts the subcarrier phase from 0° to 360° in 90° steps, while the FINE control allows continuous fine adjustment over a range of 90°.

18 Red and Blue Gain Controls (R GAIN, B GAIN)
These controls are used to manually adjust the white balance.
These controls only work when the Auto/Manual Selection switch (6) is set to the MN (Manual) position. Turn the controls clockwise to increase the Red and Blue signal levels, and counterclockwise to decrease the levels.

19 Cable Length Compensation Switch (CABLE COMP)
This switch is used to compensate for extensive cable lengths used on the 32-pin studio cable between the camera and RCU.
25m (75 ft): Use for cable lengths of less than 25m (75 ft)
50m (150 ft): Use for cable lengths of 25 - 50m (75 - 150 ft)
75m (225 ft): Use for cable lengths of 50 - 75m (150 - 225 ft)
100m (300 ft): Use for cable lengths of 75 - 100m (225 - 300 ft)

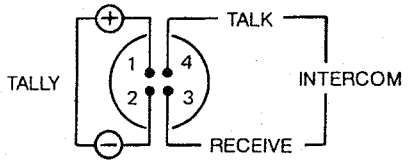
20 Luminance Gain Fine Control (Y ADJUST)
This control allows fine adjustment of the video luminance signal level for matching the levels of all cameras in the system. Adjust this control only after having set the Cable Length Compensation switch (19) to the correct position.

21 Chroma Gain Fine Control (CHROMA ADJUST)
This control allows fine control of the chroma signal level for matching the chroma levels of all cameras in the system. Adjust this control only after having set the Cable Length Compensation switch (19) to the correct position.

22 32-pin Camera Connector (CAMERA)
Connect the 32-pin studio cable from the camera to this connector.

23 S-VHS Video Output Connector (4-Pin connector) (S-VIDEO OUT)
This connector supplies a luminance and chrominance signal to the S-VHS video input connector on the S-VHS VTR or video monitor.

24 Tally and Intercom Input Connector (TALLY & INTERCOM)
Connect the 4-pin cable between this connector and the Tally & Intercom output of the Special Effects Generator.



25 Gen-lock Input Connectors (BNC) (GEN-LOCK IN)
These connectors receive the gen-lock signal (black burst or composite) from the Special Effects Generator for system reference.
Two connectors are provided for either bridging or looping application.
When the gen-lock signal is connected to only an upper (IN) connector, the gen-lock signal is automatically terminated with 75 ohms.
If two BNC connectors are connected for bridging or looping through the gen-lock signal, the gen-lock signal is not terminated with 75 ohms.

26 Auxiliary Input Connectors (BNC) (AUX IN)
These connectors receive the lineview signal from the Special Effects Generator. Two connectors are provided for bridging or looping application.
When the lineview signal is connected to only an upper (IN) connector, the signal is automatically terminated with 75 ohms. If two BNC connectors are connected for bridging or looping through the lineview signal, the lineview signal is not terminated.

27 Video Output Connectors (BNC) (VIDEO 1, 2)
These connectors supply a composite video signal to the Special Effects Generator, the Video Monitor or the VTR.

28 AC Power Cord

CIRCUIT DESCRIPTION

1. Y(Luminance) Signal Output Circuit

The Y signal from the camera is fed through pin 26 of 32-pin camera connector CN101 and pin 1 of CN10 to the Y signal gain control Q36, Q37 and VR8 (LUMINANCE GAIN FINE CONTROL) where the Y signal is amplified to the specified level.

The Y signal obtained at the emitter of Q37 is negatively fed back to the base of Q46 to compensate the frequency response of Y signal. The level and frequency response of feedback signal is selected by SW3 (CABLE LENGTH COMPENSATION SWITCH) depending upon the camera cable length for the optimum compensation. When SW3 is set to the 100m position, the base potential of Q41 and Q42 becomes high (H) level to turn them ON and the signal at the emitter of Q46 is fed back through R172, C90, Q42 and R163 to the base of Q37. At the same time, R160, R161 and C83 ~ C85 are connected between the feedback loop and ground through Q41.

When SW3 is set to the 25m, 50m or 75m position, switching transistors operate as shown in the table below and the level and frequency response of feedback signal are changed.

The frequency compensated Y signal obtained at the emitter of Q46 is supplied through amplifiers Q47 ~ Q51 to pin 3 of S-VHS connector CN7.

Position of SW3	Q41 Q42	Q40 Q43	Q39 Q44	Q45
25m	ON	OFF	OFF	OFF
50m	OFF	ON	OFF	OFF
75m	OFF	OFF	ON	OFF
100m	OFF	OFF	OFF	ON

2. C (Chrominance) Signal Output Circuit

The C signal from the camera is fed through pin 25 of 32-pin camera connector CN101 and pin 8 of CN10 to the C signal gain control Q57, Q58 and VR10 (CHROMA GAIN FINE CONTROL) where the C signal is amplified to the specified level.

The C signal obtained at the emitter of Q58 is negatively fed back to the base of Q67 to compensate the frequency response of C signal. The level and frequency response of feedback signal is selected by SW3 (CABLE LENGTH COMPENSATION SWITCH) depending upon the camera cable length for the optimum compensation. When SW3 is set to the 100m position, the base potential of Q63 becomes high (H) level to turn it ON and the signal at the emitter of Q67 is fed back through R238, C119, Q63 and R229 to the base of Q58.

When SW3 is set to the 25m, 50m or 75m position, switching transistors operate as shown in the table below and the level and frequency response of feedback signal are changed.

The frequency compensated C signal obtained at the emitter of Q67 is supplied through amplifiers Q68 ~ Q72 to pin 4 of S-VHS connector CN7.

Position of SW3	Q63	Q64	Q65	Q66
25m	ON	OFF	OFF	OFF
50m	OFF	ON	OFF	OFF
75m	OFF	OFF	ON	OFF
100m	OFF	OFF	OFF	ON

3. AUX Output Circuit

The lineview signal from the AUX connector CN5 is fed through pin 9 of CN15 to the AUX video output circuit consists of Q52 ~ Q56 and VR9 (AUX GAIN) where the lineview signal is set to the specified level.

The lineview signal is then supplied through pin 6 of CN10 to pin 23 of 32-pin camera connector CN101.

4. Encoder Output Circuit

The Y signal obtained at the emitter of Q46 and the C signal obtained at the emitter of Q67 are sent to the base of Q73 and Q74 respectively. The C and Y signals are mixed at the emitter of Q75 and the composite video signal obtained at the emitter of Q75 is amplified the specified level by amplifiers Q75 ~ Q78.

The composite video signal is then supplied through pins 5 and 7 of CN15 to VIDEO 1 output connector CN3 and VIDEO 2 output connector CN6 separately.

5. Gen-lock Sync Separation Circuit

The black burst signal supplied to the Gen-lock input connector CN1 is fed through pin 11 of CN15 to the sync separator Q32 ~ Q35 where the sync signal is separated from the black burst signal. The separated sync signal obtained at the emitter of Q30 is sent through inverter IC8 to VR3 (G/L SYNC LEVEL) where the level of sync signal is adjusted to the specified level.

The sync signal thus obtained is fed to the gen-lock output circuit in order to mix the gen-lock signal.

On the other hand, the separated sync signal is supplied to the burst flag pulse generator consists of IC6, IC7 and VR7 (BFP WIDTH) and burst gate pulse is obtained at pin 9 of IC6 (b). The burst gate pulse thus obtained is fed to the gen-lock burst gate circuit.

6. Gen-lock Burst Gate Circuit

The black burst signal supplied to the gen-lock input connector CN1 is fed through pin 11 of Cn15 to the amplifier Q25, Q26 and Q28 and burst gate IC15.
The burst gate IC15 separates the burst signal from the black burst signal by switching it using burst flag pulse supplied from the gen-lock sync separation circuit.
The gated burst signal obtained at pin 15 of IC15 is supplied to the subcarrier phase shifter consists of Q20 ~ Q23, SW2 (SC PHASE COARSE SWITCH) and VR6 (SC 90° ADJ). The subcarrier phase can be changed to 0°, 90°, 180° and 270° by SW2 and adjusted to the range of 90° by VR6.
The subcarrier signal obtained at pin 5 of SW2 is supplied to the subcarrier phase fine control Q18, Q19 and VR5 (SC FINE).
The phase adjusted subcarrier signal and the sync signal from the sync separation circuit is mixed at the emitter of Q18 and the gen-lock signal is made.

7. Gen-lock Output Circuit

The gen-lock signal obtained at the emitter of Q18 is supplied to amplifiers Q13 ~ Q17 and VR4 (BLACK BURST LEVEL) and it is amplified to the specified level.
The gen-lock signal obtained at TP3 (G/L OUT) is fed through pin 4 of CN10 to pin 22 of 32-pin camera connector CN101.

8. A/D Converter Circuit

Analog signal supplied from R GAIN, B GAIN, R PEDESTAL, B PEDESTAL, TOTAL PEDESTAL and H PHASE and H or L level signal from BAR/CAM, AUTO/MANUAL, AWC/ABC SET are fed to analog switch IC11 and IC12 respectively.
The microprocessor IC14 instructs the control (selection) pulse to the control terminals (pin 6, 9, 10, 11) of IC11 and IC12 to select one signal from these control signal (information) and selected signal is supplied from pin 3 of IC11 and IC12 to pin 24 of IC14.
The control signal supplied to pin 5 of IC14 is converted into 8-bit digital signal inside IC14 and sent from pin 5 of IC14 to camera through amplifier Q81 and pin 16 of CN101. At the same time, the serial clock pulse (synchronization pulse for serial data transmission) is generated in IC14 and sent from pin 6 of IC14 to camera through amplifier Q82 and pin 15 of CN101.
IC13 and Q80 are the reset pulse generator for the microprocessor IC14 and reset pulse obtained at the emitter of Q82 is supplied to pin 19 of IC14 for initial reset.

9. Tally Indicator Drive Circuit

The tally signal from special effect generator is fed through pin 1 of the Tally and Intercom Input connector CN103 to the tally LED driver Q6 and Q7 and the drive potential is supplied to D2 on the front board and camera through pin 4 of CN7 and pin 5 of 32-pin camera connector CN101.

ADJUSTMENT PROCEDURE

1. Disassembling Procedure for Adjustment

- Remove six screws fixing the upper panel and remove the panel. (Fig. 1-1)

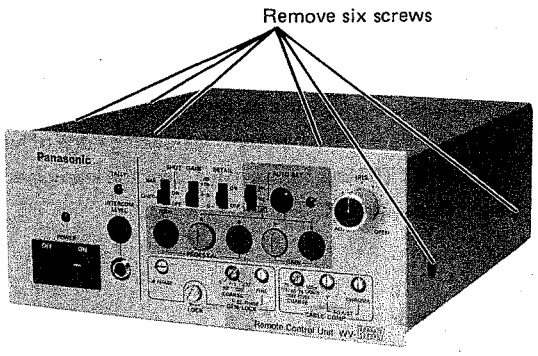


Fig. 1-1

2. Adjustment Procedure

- Disassemble the remote control unit (RCU) while referring to 1. Disassembling Procedure for Adjustment.
- Refer to the test points and adjusting controls on page 5 when adjusting the remote control unit (RCU).

2-2-1 Connection and setting up for adjustment

Connection

- Connect the camera and the remote control unit (RCU) using a 25ft 32p camera cable (32A-25).
- Connect the VIDEO OUT connector on the RCU to the VIDEO IN connector of color monitor through the waveform monitor using a coaxial cable.
- Terminate the video input of color video monitor with 75 ohms.
- Connect the PIX OUT connector on the RCU to the VIDEO IN of monochrome underscanned video monitor using a coaxial cable.
- Terminate the video input of monochrome video monitor with 75 ohms.
- Connect the BLACK BURST OUT of special effects generator or signal generator to the GEN-LOCK IN connector of RCU using a coaxial cable when instructed.

Position of controls and switches on the camera and RCU

(Camera)

Power Switch	ON
High Gain Selection Switch	0 dB

(Lens)

Iris Control Selection Switch	MAN

(Camera Adaptor)

Power Selection Switch	VTR / RCU
VTR Video Output Selection Switch	ENC

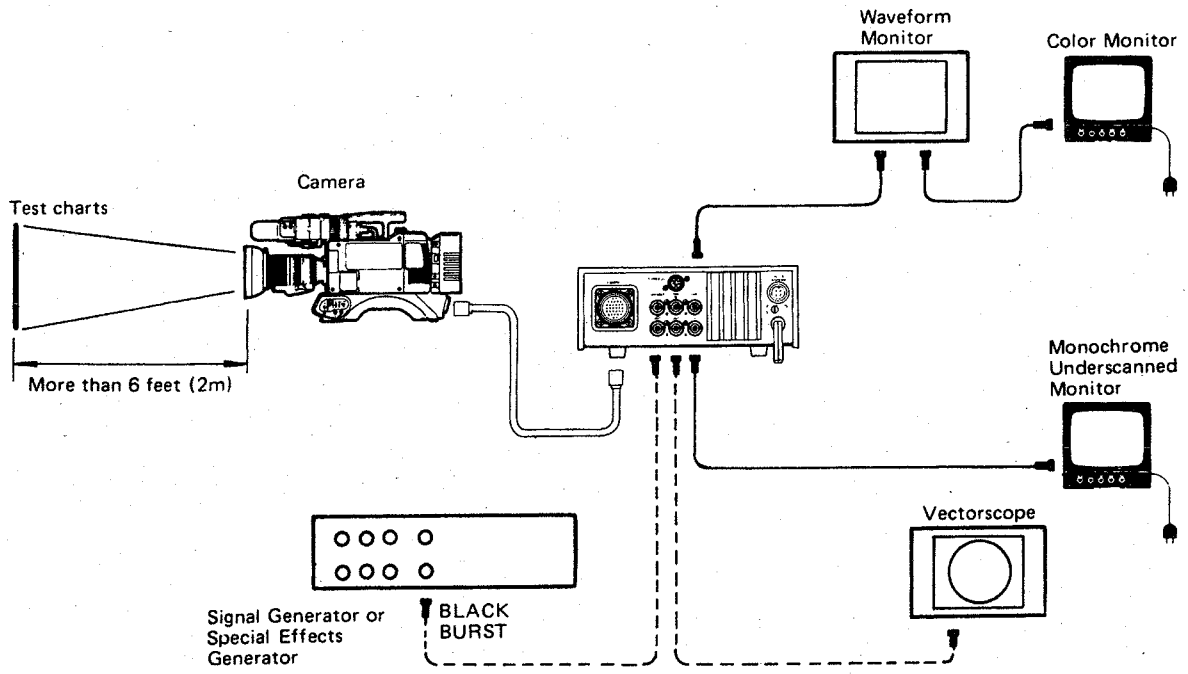


Fig. 2-2-1

(RCU)

Power Switch	ON (OFF)
Color Bar/Camera Selection & Shutter ON/OFF Switch	BAR
High Gain Selection Switch	0 dB
Detail ON/OFF Switch	ON
Auto/Manual Selection Switch	MN (AWC)
Intercom level Control	Center
Total Pedestal Level Control	Center
Red Pedestal Control	Center
Blue Pedestal Control	Center
Red Gain Control	Center
Blue Gain Control	Center
Horizontal Phase Control	Center
Subcarrier Phase Coarse Switch	0°
Subcarrier Phase Fine Control	Center
Cable Length Compensation Switch	25m
Luminance Gain Fine Control	Center
Chroma Gain Fine Control	Center
Lens Iris Control	AUTO
Incom High/Low Switch on the Main board	HIGH

Note : The position shown with ( ) is for factory shipment.

(1) + 15.2V (Camera Output Voltage) adjustment

Test point :	**TP1 (CAM + 15.2V)**	**Main board**
Adjust :	**VR1 (CAM + 15.2V ADJ)**	**Main board**

- Connect the camera (WV-F70) to the RCU using 32-pin studio cable (32A-25) and set the Power switch on the camera to ON position.
- Connect the plus terminal of digital voltmeter (DVM) to TP1 (CAM + 15.2V) and the minus terminal to "FG" terminal on the Main board.
- Adjust VR1 (CAM + 15.2V ADJ) for + 15.2V ± 0.05V.

(2) + 9V adjustment

Test point :	**TP11 (+ 9V)**	**Main board**
Adjust :	**VR2 (+ 9V ADJ)**	**Main board**

- Connect the plus terminal of digital voltmeter (DVM) to TP11 (+ 9V) and the minus terminal to "FG" terminal on the Main board.
- Adjust VR2 (+ 9V ADJ) for + 9.0V ± 0.05V.

(3) Burst gate pulse phase adjustment

Test points :	**TP4 (BFP)**	**Main board**
	TP16 (G/L IN)	**Main board**
Adjust :	**VR7 (BFP WIDTH)**	**Main board**

- Supply the black burst signal (BBS) of special effects generator or signal generator to the GEN-LOCK IN connector on the rear of the remote control unit (RCU).
- Connect the 2 probes of the oscilloscope to TP4 (BFP) and TP16 (G/L IN).
- Trigger the oscilloscope at H rate.
- Set the oscilloscope to H rate and dual display.
- Expand the portion of burst gate pulse on the oscilloscope.
- Adjust VR7 (BFP WIDTH) so that the leading edge of burst gate pulse at TP4 lags 5 µsec ± 0.1 µsec the leading edge of sync signal at TP16. (Fig. 2-2-1)

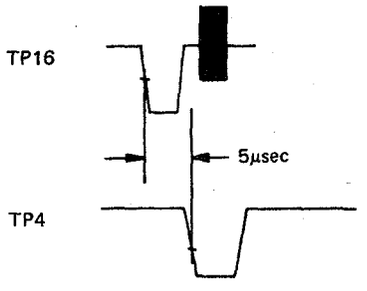


Fig. 2-2-1

(4) Subcarrier 90° phase shifter adjustment

Test point :	**TP3 (G/L OUT)**	**Main board**
Adjusts :	**VR6 (SC 90° ADJ)**	**Main board**
	VR3 (SYNC LEVEL)	**Main board**
	VR4 (BURST LEVEL)	**Main board**
Observe :	**Vectorscope**	

- Keep the Black Burst signal connected as in the preceding step.
- Cap on the lens or set the filter wheel to the position 4.
- Set the Camera / Color Bar Selection Switch on the RCU to CAMERA position.
- Connect the vectorscope to the VIDEO 1 or VIDEO 2 connector and terminate the input of vectorscope with 75 ohms.
- Supply an external subcarrier signal to the external subcarrier reference (EXT CW ø REF) connector of vectorscope from the signal generator or special effects generator.
- Set the burst mode (ø REF) of the vectorscope to the EXT position.
- Set VR3 (SYNC LEVEL) and VR4 (BURST LEVEL) to their mechanical center.
- Set SW2 (SC PHASE COARSE) to the 0° position and turn VR5 (SC FINE) fully counterclockwise.

- Turn the phase control of vectorscope so that the burst vector for even field positions at the B-Y (U) axis of vectorscope.
- Set SW2 (SC PHASE COARSE) to the 90° position.
- Adjust VR6 (SC 90° ADJ) so that the burst vector for even field coincides with the R-Y (V) axis on the vectorscope.
- Reset the SW2 (SC PHASE COARSE) to the 0° position.
- Connect the oscilloscope to TP3 (G/L OUT).
- Trigger the oscilloscope at H rate.
- Adjust VR4 (BURST LEVEL) and VR3 (SYNC LEVEL) so that the burst level and sync level become 0.35Vp-p ± 0.02Vp-p respectivily.

(5) Auxiliary (AUX) gain adjustment

Test point :	**AUX INPUT connector**	
Adjust :	**VR9 (AUX GAIN)**	**Main board**

- Set SW3 (CABLE LENGTH COMPENSATION SWITCH) in front of RCU to 25m position.
- Supply the stair step signal of signal generator to the AUX IN connector of the remote control unit (RCU).
- Connect the oscilloscope to the AUX INPUT connector and TP11.
- Trigger the oscilloscope at H rate.
- Adjust AUX GAIN VR20 so that the signal levels especially the sync signals are equal.

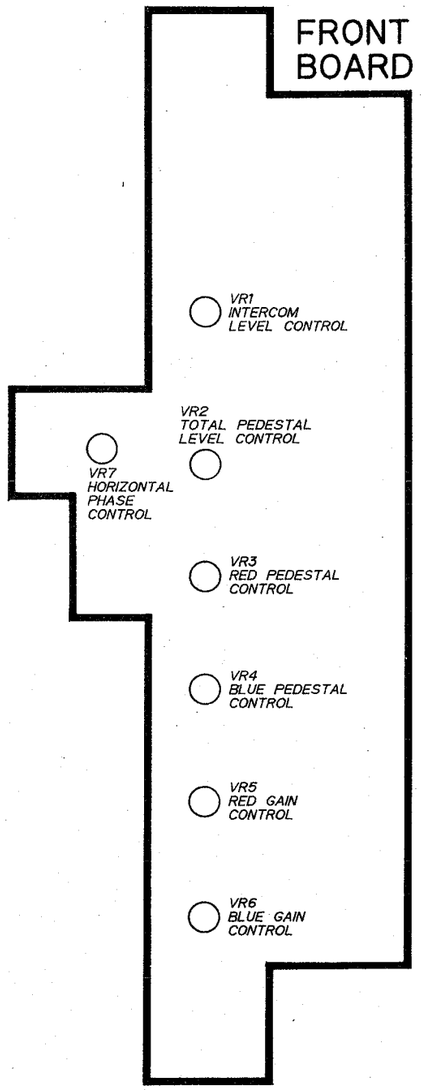
(6) Iris preset adjustment

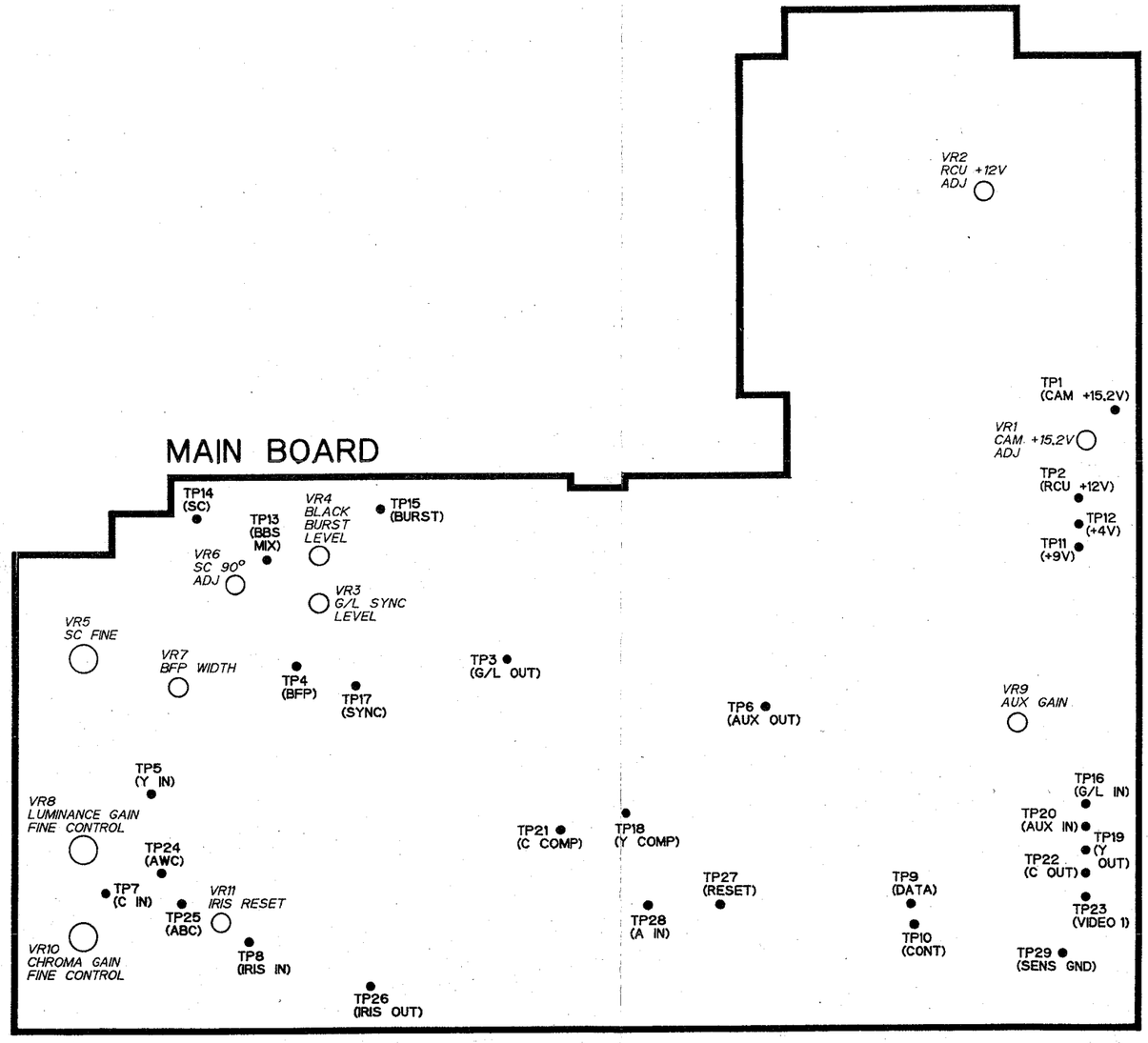
Test points :	**TP8 (IRIS IN)**	**Main board**
	TP29 (SENS GND)	**Main board**
Adjust :	**VR11 (IRIS PRESET)**	**Main board**

- Turn VR101 (LENS IRIS CONTROL) on the front of RCU fully counterclockwise and stop it just before switched to the AUTO position.
- Connect the plus probe of digital voltmeter to TP8 (IRIS IN) and minus probe to TP29 (SENS GND).
- Adjust VR11 (IRIS PRESET) for + 1.8V ± 0.05V.

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

— Component Side —

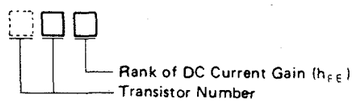




CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.



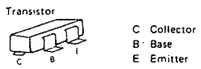
Transistor Number

Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

Example

WQ ⟶ 2SD602 – Q
YQ ⟶ 2SD601 – Q
1BS ⟶ 2SB814 – S

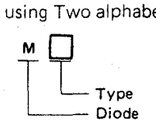
Appearance and Symbols



	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

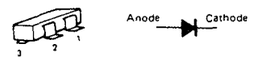
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.



Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

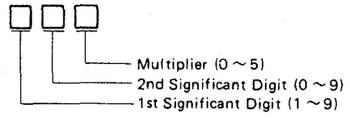
Appearance and Symbols



	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.



EXAMPLE:

330 ⟶ 33×10^0 = 33 ohms
561 ⟶ 56×10^1 = 560 ohms
123 ⟶ 12×10^3 = 12 kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

4. Chip Capacitor

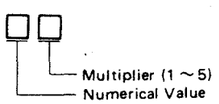
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 ⟶ 0.5 pF 2.5 ⟶ 2.5 pF
75 ⟶ 0.75 pF 33 ⟶ 33 pF
1 ⟶ 1 pF 82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

EXAMPLE:

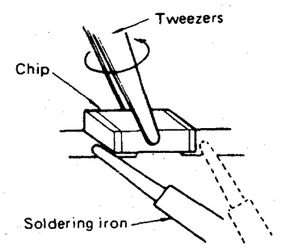
A1 ⟶ 10×10^1 = 100 pF
N2 ⟶ 33×10^2 = 3300 pF
S3 ⟶ 47×10^3 = 47000 pF

4. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

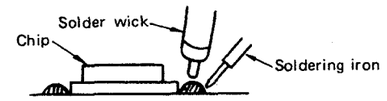
4-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note: Be careful not to damage other chips.

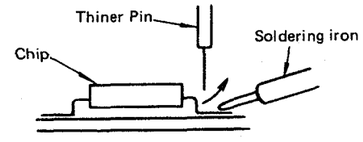


4-2 Removal (IC)

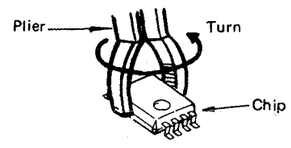
1. Add the solder wick and solder iron to each lead of the IC and remove solder.



2. Add the solder iron to each lead of the IC and left each lead of the IC using thiner pin.

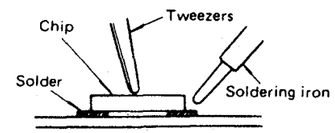


3. Remove IC turning it with plier.

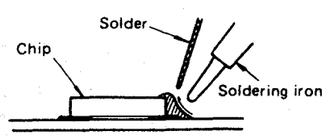


4-3 Mounting

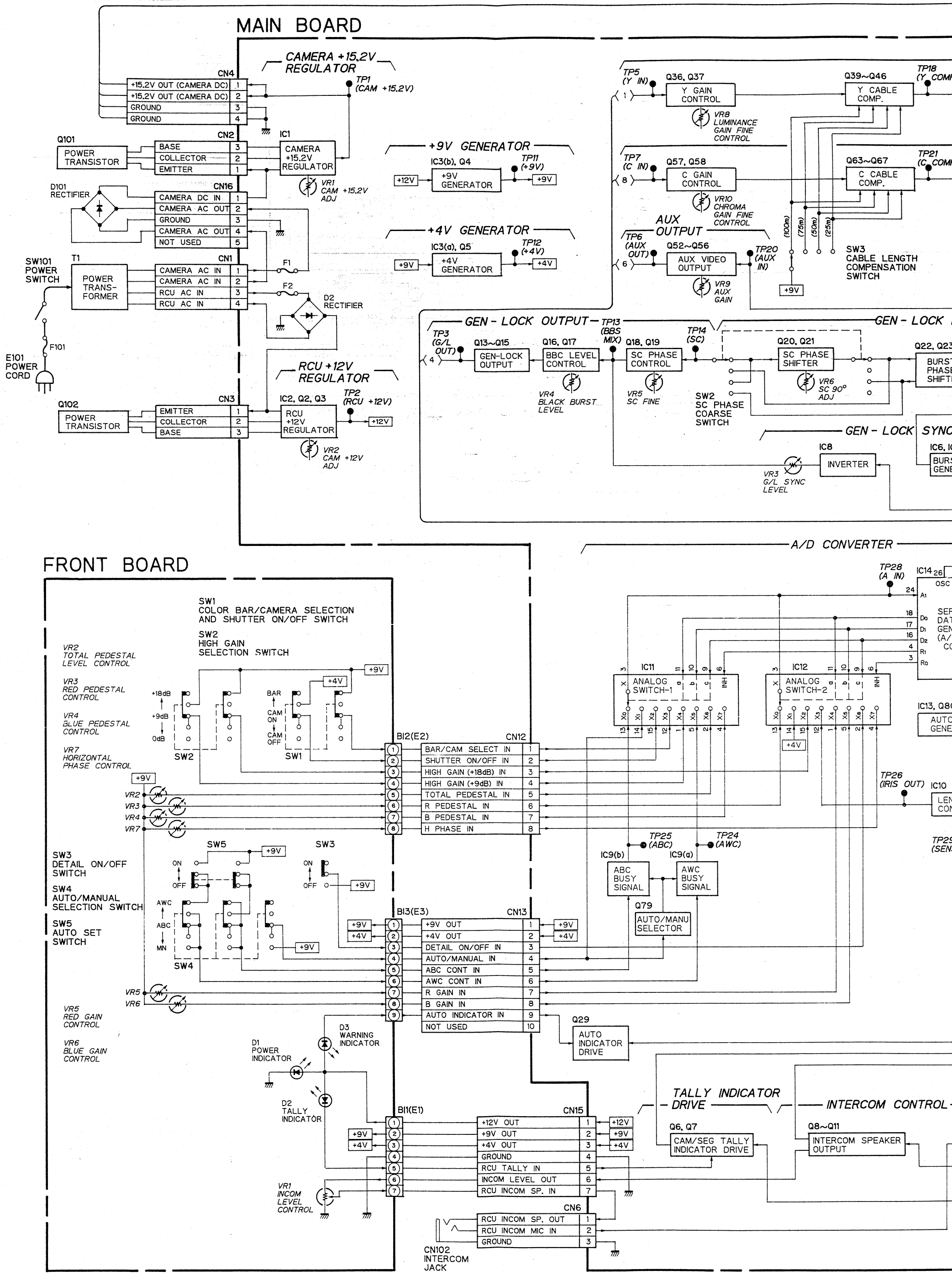
1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.



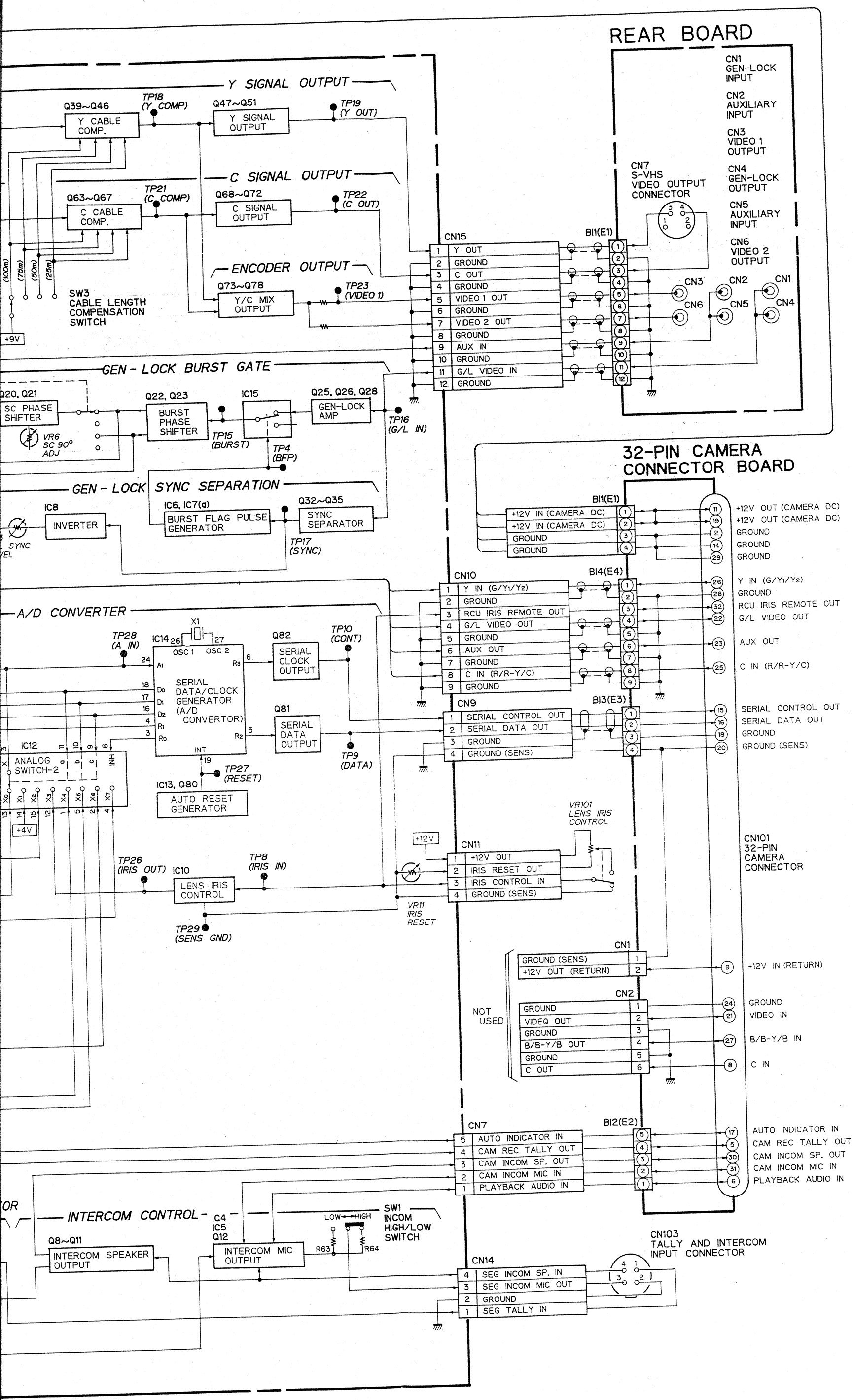
3. Solder both ends of chip (three leads for chip transistor).



BLOCK DIAGRAM OF REMOTE CONTROL UN



E CONTROL UNIT WV-RC37



SCHEMATIC DIAGRAM OF REMOTE C

MAIN BOARD

CN4: +15.2V OUT (CAMERA DC) 1; +15.2V OUT (CAMERA DC) 2; GROUND 3; GROUND 4

TP1 (CAM +15.2V) — CAMERA +15.2V REGULATOR — VR1 6.8K — V1 CAM +15.2V ADJ — IC1 — C7 0.1µF 50V, C6 4700µF 25V, C9 1µF 50V, R5 20K, R3 3.3K, C8 1000PF, R2 470, R1 330, C4 0.1µF 50V, C5 15000µF 25V

Q101 POWER TRANSISTOR — Q101 — CN2: BASE 3; COLLECTOR 2; EMITTER 1

D101 RECTIFIER — D101 — CN16: CAMERA DC IN 1; CAMERA AC OUT 2; GROUND 3; CAMERA AC OUT 4; NOT USED 5

C1~C3 0.01µF500V (x3)

T101 POWER TRANS-FORMER — T101 — F1 3.15A — F2 1.25A — CN1: CAMERA AC IN 1; CAMERA AC IN 2; RCU AC IN 3; RCU AC IN 4

D2 RECTIFIER — D2 — C11 0.01µF 500V, C166 0.01µF 500V, C12 0.01µF 500V, C14 4700µF 25V, C13 0.1µF 50V

SW101 POWER SWITCH — F101 800mA — E101 AC POWER CORD

Q102 POWER TRANSISTOR — Q102 — CN3: EMITTER 1; COLLECTOR 2; BASE 3

RCU +12V REGULATOR — VR2 RCU +12V ADJ — TP2 (RCU +12V) — IC2 — R10 330, R13 2.7K, C15 33µF 25V, R8 3.3K, Q2, D5, D6, D7, R11 6.8K, Q3, D4, D3, R9 3.3K, R12 150, R14 2.2K, R15 10K, C16 1000PF, VR2 1K, R17 3K, R18 1K, R19 4.7K, C19 0.1µF 50V, C18 2200µF 16V, R16 3.3K, C17 10µF 25V

IC2, Q2, Q3 RCU +12V REGULATOR

+9V GENERATOR — TP11 (+9V) — R20 10K, R22 10K, R25 1K, Q4, R26 1K, C20 47µF 16V, R21 10K, R24 20K, IC3(b), C22 0.1µF 50V, C21 100µF 16V

IC3(b), Q4 +9V GENERATOR

+4V GENERATOR — TP12 (+4V) — R27 20K, R29 10K, C25 0.1µF 50V, C24 100µF 10V, C23 47µF 16V, R28 10K, R31 30K, IC3(a), R34 1K, Q5, R33 1K

IC3(a), Q5 +4V GENERATOR

SW3 CABLE LENGTH COMPENSATION SWITCH — SW3 — (100m) (75m) (50m)

Q36, Q37 Y GAIN CONTROL — C72 47µF 16V, TP5 (Y IN), C73 47µF10V, R142 27K, R144 100, Q36, R146 220, VR8 500, Q37, R147 4.7K, R149 10K, R150 1K, R141 75, R143 10K, R145 820, R148 1.2K

VR8 LUMINANCE GAIN FINE CONTROL

Q42: C86 1000PF, R167 22K, R163 750, R161 33K, R160 3.3K, C85 24PF, C83 30PF, C84 120PF, R162 22K, Q41

Q43: C87 1000PF, R168 22K, R164 680, R158 47K, R157 5.6K, C82 15PF, C80 15PF, C81 100PF, R159 22K, Q40

Q44: C88 1000PF, R169 22K, R165 620, R154 1.6K, C77 6PF, R156 22K, Q3

Q57, Q58 C GAIN CONTROL — C101 47µF 16V, TP7 (C IN), C102 47µF10V, R208 27K, R210 100, Q57, R212 100, VR10 1K, Q58, R213 4.7K, R215 10K, R216 1K, R207 75, R209 10K, R211 820, R214 1.2K

VR10 CHROMA GAIN FINE CONTROL

Q63: C115 1000PF, R233 22K, R229 1.6K, R117 47K

Q64: C116 1000PF, R234 22K, R230 1.3K, R118 47K

Q65: C117 1000PF, R235 22K, R231 1.1K, R119 47K

AUX OUTPUT — Q52~Q56 AUX VIDEO OUTPUT — TP6 (AUX OUT), R191 75, C96 2200µF 16V, D10 (8V), Q52, Q53, R194 33, Q54, R198 10, R197 10K, R196 2.2K, C97 30PF, R199 5.6K, Q55, R200 1.5K, L2 47µH, C98 27pF, R201 2.7K, VR9 470 AUX GAIN, R202 1.5K, Q56, R203 560, R204 820, R205 27K, R307 100, C99 47µF10V, R206 10K, TP20 (AUX IN), C100 47µF 16V, R192 22K, R193 180, R195 33

GEN-LOCK OUTPUT — Q13~Q15 GEN-LOCK OUTPUT — TP3 (G/L OUT), C43 47µF 16V, C44 2200µF 16V, R65 75, D8 (8V), Q13, Q14, R66 22K, R67 180, R68 33, Q15, R72 10, R71 1.8K, R70 2.2K, C45 30PF, R73 5.6K, Q16, R74 1.5K, R75 2.7K, C50 47µF 16V, VR4 1K, R76 1.5K, R78 390, R79 1.5K, Q17, R80 27K, C47 100µF10V, TP13 (BBS MIX), R81 10K, R77 470, Q18, R82 1.5K, R83 180, C48 100PF, VR5 1K, R84 560, R86 8.2K, Q19, R85 560, C49 0.01µF, TP14 (SC), R87 3.9K

Q16, Q17 BBS LEVEL CONTROL — VR4 BLACK BURST LEVEL

Q18, Q19 SC PHASE CONTROL — VR5 SC FINE

Q20, Q21 SC PHASE SHIFTER — Q20, C51 100PF, R90 560, R92 8.2K, SW2 SC PHAS COARSE, Q21, C52 0.01µF, R89 270, R88 1.5K, R91 560, VR6 1K, R93 3.9K

VR6 SC 90° ADJ

VR7 BFP WIDTH — VR7 4.7K — IC6(b), IC6(a) — C70 47µF 16V, C46 220µF10V, R126 5.1K, VR3 4.7K, C158 51pF, IC8(a), IC8(b), IC8(c), IC8(d), TP4 (BFP), C62 47µF 16V, R123 8.2K, C63 330PF, R124 8.2K, C64 330PF, C65 47µF 16V

VR3 G/L SYNC LEVEL — IC8 INVERTER — IC6, IC7(a) BURST FLAG PULSE GENERATOR

A/D CONVERTER

IC9(b) ABC BUSY SIGNAL — C128 47µF 10V, D13, C130 100µF 10V, C136 0.22µF 50V, R283 1M, C135 10µF16V, R279 10K, Q79, R280 2.2K, C129 47µF 10V, C131 10µF 16V, C134 0.22µF 50V, R282 1M, C133 47µF 16V, C132 10µF16V, IC9(b), IC9(a)

Q79 AUTO/MANU SELECTOR — IC9(a) AWC BUSY SIGNAL — TP25 (ABC) — TP24 (AWC)

IC11 ANALOG SWITCH-1 — C139 47µF 16V, C140 0.1µF, C141 C142 C143 C144 C145 C146 C147 C148 0.1µF (x8), C137 0.1µF

IC10 LENS IRIS CONTROL — IC10(a), IC10(b) — R286 7.5K, C138 47µF 16V, R287 11K, R288 20K — TP8 (IRIS IN) — TP26 (IRIS OUT) — TP29 (SENS GND)

FRONT BOARD

SW1 CAM OFF — CAM ON — BAR — R3 10K, R4 10K

SW2 0dB — +9dB — +18dB — R5 10K, R6 10K

SW3 OFF — ON — C3 47µF 10V, C4 47µF 10V, R7 10K

SW4 MN — ABC — AWC — R8 10K, R9 10K

SW5 ON — OFF — R10 10K, R11 10K, C2 47µF10V

BI2(E2) CN12: BAR/CAM SELECT IN 1; SHUTTER ON/OFF IN 2; HIGH GAIN (+18dB) IN 3; HIGH GAIN (+9dB) IN 4; TOTAL PEDESTAL IN 5; R PEDESTAL IN 6; B PEDESTAL IN 7; H PHASE IN 8

VR2 TOTAL PEDESTAL LEVEL CONTROL

VR3 RED PEDESTAL CONTROL

VR4 BLUE PEDESTAL CONTROL

VR7 HORIZONTAL PHASE CONTROL

VR6 BLUE GAIN CONTROL

VR5 RED GAIN CONTROL — VR5 10K — VR2 10K, VR3 10K, VR4 10K, VR7 10K, VR6 10K

BI3(E3) CN13: +9V OUT 1; +4V OUT 2; DETAIL ON/OFF IN 3; AUTO/MANUAL IN 4; ABC CONT IN 5; AWC CONT IN 6; R GAIN IN 7; B GAIN IN 8; AUTO INDICATOR IN 9; NOT USED 10

D3 : AUTO WARNING INDICATOR

D1 : POWER INDICATOR

D2 : TALLY INDICATOR

R1 680, D1, D3, D2, C1 47µF 16V, R2 560

Q29 AUTO INDICATOR DRIVE — Q29, R121 10K, R122 10K, C61 0.1µF

BI1(E1) CN5: +12V OUT 1; +9V OUT 2; +4V OUT 3; GROUND 4; RCU TALLY IN 5; INCOM LEVEL OUT 6; RCU INCOM SP. IN 7

VR1 INCOM LEVEL CONTROL — VR1 1K

CN102 INTERCOM JACK — CN6: RCU INCOM SP. OUT 1; RCU INCOM MIC IN 2; GROUND 3

TALLY INDICATOR DRIVE — Q7, R37 100K, R39 10K, C27 1000PF, Q6, R35 5.6K, R36 22K, R38 5.6K

Q6, Q7 CAM/SEG TALLY INDICATOR DRIVE

Q11, C31 10µF16V, R46 330

Q10, C30 10µF16V, R45 330

Q9, C29 4700 PF, R44 390

Q8, R43 10K, R42 4.7K, R40 33K, C28 10µF16V, R41 4.7K

Q8~Q11 INTERCOM SPEAKER OUTPUT — R47 270, C32 10µF16V

INTE

OTE CONTROL UNIT WV-RC37

CN8

6	GROUND
5	CABLE COMP (100m)
4	CABLE COMP (75m)
3	CABLE COMP (50m)
2	CABLE COMP (25m)
1	+12V

NOT USED

PRODUCT SAFETY NOTICE
COMPONENT IDENTIFIED WITH THE "⚠" MARK HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN SERVICING ANY OF THESE COMPONENTS, IT IS ESSENTIAL THAT ONLY MANUFACTURE'S SPECIFIED PARTS BE USED.

REAR BOARD

CN7 S-VHS VIDEO OUTPUT CONNECTOR

CN3 VIDEO 1 OUTPUT
CN2 AUXILIARY INPUT
CN1 GEN-LOCK INPUT
CN6 VIDEO 2 OUTPUT
CN5 AUXILIARY INPUT
CN4 GEN-LOCK OUTPUT

CN15

1	Y OUT
2	GROUND
3	C OUT
4	GROUND
5	VIDEO 1 OUT
6	GROUND
7	VIDEO 2 OUT
8	GROUND
9	AUX IN
10	GROUND
11	G/L VIDEO IN
12	GROUND

BI1(E1)

32-PIN CAMERA CONNECTOR BOARD

CN101 32-PIN CAMERA CONNECTOR

BI1(E1)

+15.2V IN (CAMERA DC)	1
+15.2V IN (CAMERA DC)	2
GROUND	3
GROUND	4

11, 19
2,14,29

CN101

1	NOT USED
2	GROUND
3	NOT USED
4	NOT USED
5	CAM REC TALLY OUT
6	PLAYBACK AUDIO IN
7	NOT USED
8	C IN
9	+12V IN (RETURN)
10	NOT USED
11	+15.2V OUT (CAMERA DC)
12	NOT USED
13	NOT USED
14	GROUND
15	SERIAL CONTROL OUT
16	SERIAL DATA OUT
17	AUTO INDICATOR IN
18	GROUND
19	+15.2V OUT (CAMERA DC)
20	GROUND (SENS)
21	VIDEO IN
22	G/L VIDEO OUT
23	AUX OUT
24	GROUND
25	C IN (R/R-Y/C)
26	Y IN (G/Y1/Y2)
27	B/B-Y/B IN
28	GROUND
29	GROUND
30	CAM INCOM SP. OUT
31	CAM INCOM MIC IN
32	RCU IRIS REMOTE OUT

CN10

1	Y IN (G/Y1/Y2)
2	GROUND
3	RCU IRIS REMOTE OUT
4	G/L VIDEO OUT
5	GROUND
6	AUX OUT
7	GROUND
8	C IN (R/R-Y/C)
9	GROUND

BI4(E4)

CN1

1	GROUND
2	VIDEO OUT
3	GROUND
4	B/B-Y/B OUT
5	GROUND
6	C OUT

NOT USED

CN9

1	SERIAL CONTROL OUT
2	SERIAL DATA OUT
3	GROUND
4	GROUND (SENS)

BI3(E3)

CN2

1	GROUND (SENS)
2	+12V OUT (RETURN)

NOT USED

CN11

1	+12V OUT
2	IRIS PRESET OUT
3	IRIS CONTROL IN
4	GROUND (SENS)

VR11 IRIS PRESET
VR101 LENS IRIS CONTROL

CN7

5	AUTO INDICATOR IN
4	CAM REC TALLY OUT
3	CAM INCOM SP. OUT
2	CAM INCOM MIC IN
1	PLAYBACK AUDIO IN

BI2(E2)

CN14

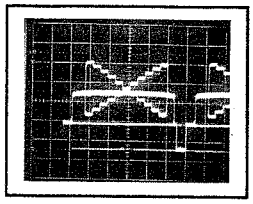
4	SEG INCOM SP. IN
3	SEG INCOM MIC OUT
2	GROUND
1	SEG TALLY IN

CN103 TALLY AND INTERCOM INPUT CONNECTOR

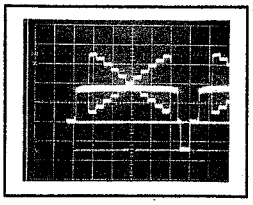
Y SIGNAL OUTPUT
Q47~Q51 Y SIGNAL OUTPUT
Q39~Q46 Y CABLF COMP
C SIGNAL OUTPUT
Q68~Q72 C SIGNAL OUTPUT
Q63~Q67 C CABLE COMP
ENCODER OUTPUT
Q73~Q78 Y/C MIX OUTPUT
GEN-LOCK BURST GATE
Q22, Q23 BURST PHASE SHIFTER
IC15 BURST GATE
Q25, Q26, Q28 GEN-LOCK AMP
GEN-LOCK SYNC SEPARATION
Q30 BUFFER
Q32~Q35 SYNC SEPARATOR
A/D CONVERTER
IC12 ANALOG SWITCH-2
IC13, Q80 AUTO RESET GENERATOR
IC14 SERIAL DATA/CLOCK GENERATOR (A/D CONVERTER)
Q82 SERIAL CLOCK OUTPUT
Q81 SERIAL DATA OUTPUT
INTERCOM CONTROL
IC4, IC5, Q12 INTERCOM MIC OUTPUT
SW1 INCOM HIGH/LOW SWITCH

< Waveforms >

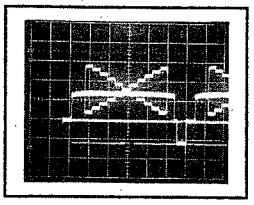
1. 0.2V/DIV, 10μs/DIV



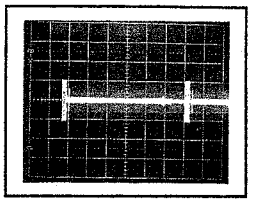
2. 0.2V/DIV, 10μs/DIV



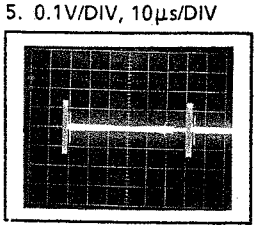
3. 0.5V/DIV, 10μs/DIV



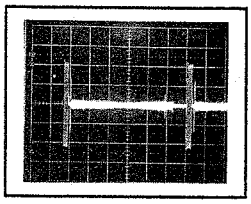
4. 0.1V/DIV, 10μs/DIV



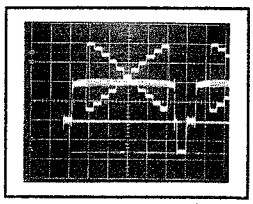
5. 0.1V/DIV, 10μs/DIV



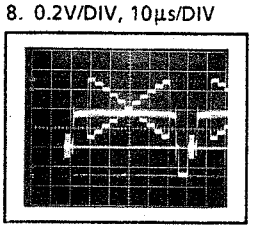
6. 0.1V/DIV, 10μs/DIV



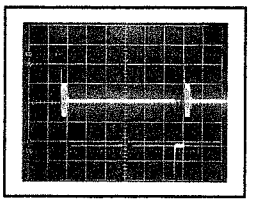
7. 0.2V/DIV, 10μs/DIV



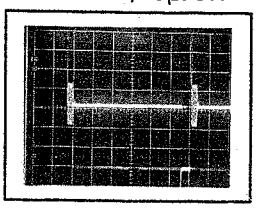
8. 0.2V/DIV, 10μs/DIV



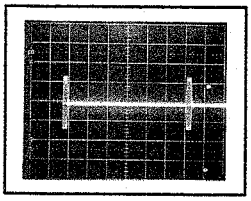
9. 0.2V/DIV, 10μs/DIV



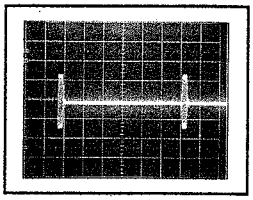
10. 0.2V/DIV, 10μs/DIV



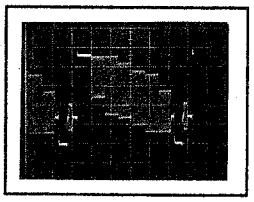
11. 0.2V/DIV, 10μs/DIV



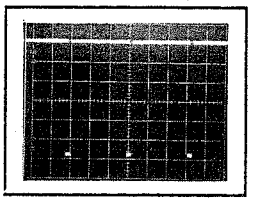
12. 0.2V/DIV, 10μs/DIV



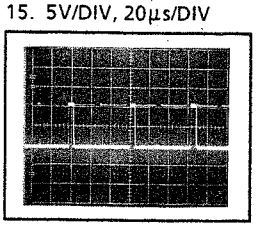
13. 0.2V/DIV, 10μs/DIV



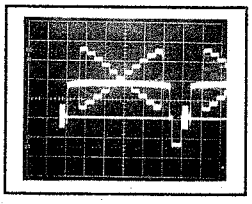
14. 2V/DIV, 20μs/DIV



15. 5V/DIV, 20μs/DIV



16. 0.2V/DIV, 10μs/DIV



< Voltages >

	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC12	IC13	IC14	IC15
Pin 1	0	0	10.6	10.9	1.3	0	0	1.0	4.0	0.8	4.0	4.8	1.4	9.0	0
2	1.8	0	6.0	0	0	11.1	5.5	1.0	9.0	0.8	5.6	4.0	0.5	0	11.2
3	1.7	0	6.0	12.0	0	0	12.0	10.9	4.1	0	8.2	-	0	0.1	0
4	0.5	7.2	0	0	0	0	1.0	1.0	4.0	0	5.6	4.0	0	0.1	0
5	0	7.2	3.0	1.2	0	2.1	12.0	0	9.0	4.1	4.0	5.6	9.0	0.1	0
6		7.2	3.0	1.2	11.6	0.8	9.8	10.9	4.0	4.1	7.3	7.4	0	0.1	0
7		0	0	0	5.7	11.1	2.1	0	9.0	4.1	4.0	4.0	0	0.1	0.6
8		0	12.0	12.0	0	0	0	1.0	4.0	12.0	0	0	8.4	0.1	12.0
9		8.1				11.2	12.0	1.0	9.0		-	-		0.1	0.6
10		14.7				0.7	0	10.9	4.0		-	-		9.0	0.3
11		0				0.8	12.0	12.0	9.0		-	-		0.1	0
12		17.1				0	0	0	4.0		4.0	4.1		0.1	0
13		15.9				12.0	0	0	4.1		4.0	5.6		0.1	0
14		0				11.2	12.0	12.0	9.0		9.0	4.0		0.1	0
15						0	0		4.0		9.0	4.0		0	0
16						12.0	12.0		9.0		9.0	9.0		0	0
														0.1	
														0.1	
														0	
														0	
														0	
														0	
														9.0	
														0	
														0	
														0	
														5.6	
														0	

	B	C	E
Q2	15.7	1.0	16.5
Q3	1.6	1.0	1.0
Q4	11.4	9.0	12.0
Q5	0.6	4.0	0
Q6	12.0	0.1	120
Q7	4.7	4.1	4.0
Q8	1.5	12.0	0.9
Q9	0.9	3.0	0.3
Q10	3.0	12.0	2.3
11	3.0	120	2.3
Q12	6.3	12.0	5.8
Q13	0	11.3	5.1
Q14	1.1	5.1	0.4
Q15	6.4	12.0	0
Q16	3.5	6.4	2.8
Q17	3.2	12.0	2.5
Q18	3.0	2.0	2.3
Q19	3.8	9.0	3.0
Q20	0	120	0
Q21	3.8	8.9	3.0
Q22	9.1	12.0	8.3
Q23	3.7	9.1	2.9
Q25	5.9	0	5.2
Q26	2.8	5.9	2.1
Q28	3.7	12.0	3.0
Q29	0	10.5	0
Q30	1.1	12.0	1.0
Q32	12.1	1.1	12.0

	B	C	E
Q33	9.1	12.0	8.3
Q34	3.5	9.1	2.8
Q35	3.5	12.0	2.8
Q36	3.2	12.	2.6
Q37	3.0	5.0	2.4
Q38	0.7	0	0
Q39	0	0	0
Q40	0	0	0
Q41	0	0	0
Q42	0	4.2	3.0
Q43	0	4.2	3.0
Q44	0	4.2	3.0
Q45	4.8	4.2	4.1
Q46	5.0	12.0	4.4
Q47	3.1	12.0	2.5
Q48	3.0	8.0	2.4
Q49	8.0	12.0	7.4
Q50	7.4	11.3	6.8
Q51	1.1	6.8	0.5
Q52	7.7	11.3	7.1
Q53	1.1	7.1	0.5
Q54	8.3	12.0	7.7
Q55	2.9	8.3	2.3
Q56	3.1	12.0	2.5
Q57	3.2	12.0	2.6

	B	C	E
Q58	2.9	5.7	2.3
Q59	0.7	0	0
Q60	0	0	0
Q61	0	0	0
Q62	0	0	0
Q63	0	4.8	2.9
Q64	0	4.8	2.9
Q65	0	4.8	2.9
Q66	5.4	4.8	4.8
Q67	5.6	12.0	5.0
Q68	3.1	12.0	2.5
Q69	3.0	8.1	2.4
Q70	7.6	12.0	0
Q71	7.3	11.3	6.7
Q72	1.1	6.7	0.5
Q73	3.1	12.0	2.5
Q74	3.1	12.0	2.5
Q75	3.1	7.3	2.5
Q76	7.3	12.0	6.7
Q77	6.7	11.3	6.1
Q78	1.1	6.1	0.5
Q79	4.7	4.1	4.0
Q80	0	-	9.0
Q81	0.1	-	0
Q82	0.7		0

< Index > — Schematic Diagram —

Main Board

IC1	F2
IC2	E2
IC3	D2, D3
IC4	A6
IC5	A7
IC6	C5
IC7	C5, C6
IC8	C4
IC9	B3
IC10	B4, B5
IC11	B4
IC12	B5
IC13	B6
IC14	B7
IC15	D6
Q2	E2
Q3	E2
Q4	D2
Q5	D3
Q6	A4
Q7	A3
Q8	A5
Q9	A5
Q10	A4
Q11	A4
Q12	A5
Q13	D3
Q14	D3
Q15	D3
Q16	D3
Q17	D4
Q18	D4
Q19	D4
Q20	D5
Q21	D5
Q22	D6
Q23	D6
Q25	D6
Q26	D7
Q28	D7
Q29	B2
Q30	C6
Q32	C6
Q33	C7
Q34	C7
Q35	C7
Q36	F4
Q37	F4
Q38	F4
Q39	F5
Q40	F5
Q41	F4
Q42	F4
Q43	F5
Q44	F5
Q45	F6
Q46	F6
Q47	F6
Q48	F7
Q49	F7
Q50	F7
Q51	F7
Q52	D4
Q53	D4
Q54	E4
Q55	D4
Q56	D5
Q57	E4
Q58	E4
Q59	F4
Q60	F4
Q61	F4
Q62	F4
Q63	E4
Q64	E5
Q65	E5
Q66	E6
Q67	E6
Q68	E6
Q69	E6
Q70	E7
Q71	E7
Q72	E7
Q73	E6
Q74	E6
Q75	D6
Q76	E7
Q77	D7
Q78	D7
Q79	B3
Q80	B6
Q81	B7
Q82	B7
D2	E2
D3	E2
D4	E2
D5	E2
D6	E2
D7	E2
D8	D3
D9	F7
D10	E4
D11	E7
D12	E7
D13	B3
D14	B6
Q101	F1
Q102	E1

Front board

D1	A1
D2	A2
D3	B2

< Index > — Conductor View —

Main Board

IC1	B7
IC2	B7
IC3	C7
IC4	C6
IC5	C5
IC6	D4
IC7	D4
IC8	D4
IC9	E3
IC10	E4
IC11	E5
IC12	E5
IC13	E6
IC14	E6
IC15	C4
Q2	B6
Q3	B6
Q4	C7
Q5	C7
Q6	C6
Q7	C6
Q8	C6
Q9	C6
Q10	C6
Q11	C6
Q12	C6
Q13	C4
Q14	C4
Q15	C4
Q16	C4
Q17	C4
Q18	C3
Q19	C3
Q20	C4
Q21	C4
Q22	C4
Q23	C4
Q25	C5
Q26	C5
Q28	C5
Q29	D3
Q30	D4
Q32	D5
Q33	D5
Q34	D5
Q35	D5
Q36	D3
Q37	D4
Q38	D4
Q39	D4
Q40	D4
Q41	D4
Q42	D5
Q43	D5
Q44	D5
Q45	D5
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Q50	D6
Q51	D6
Q52	D7
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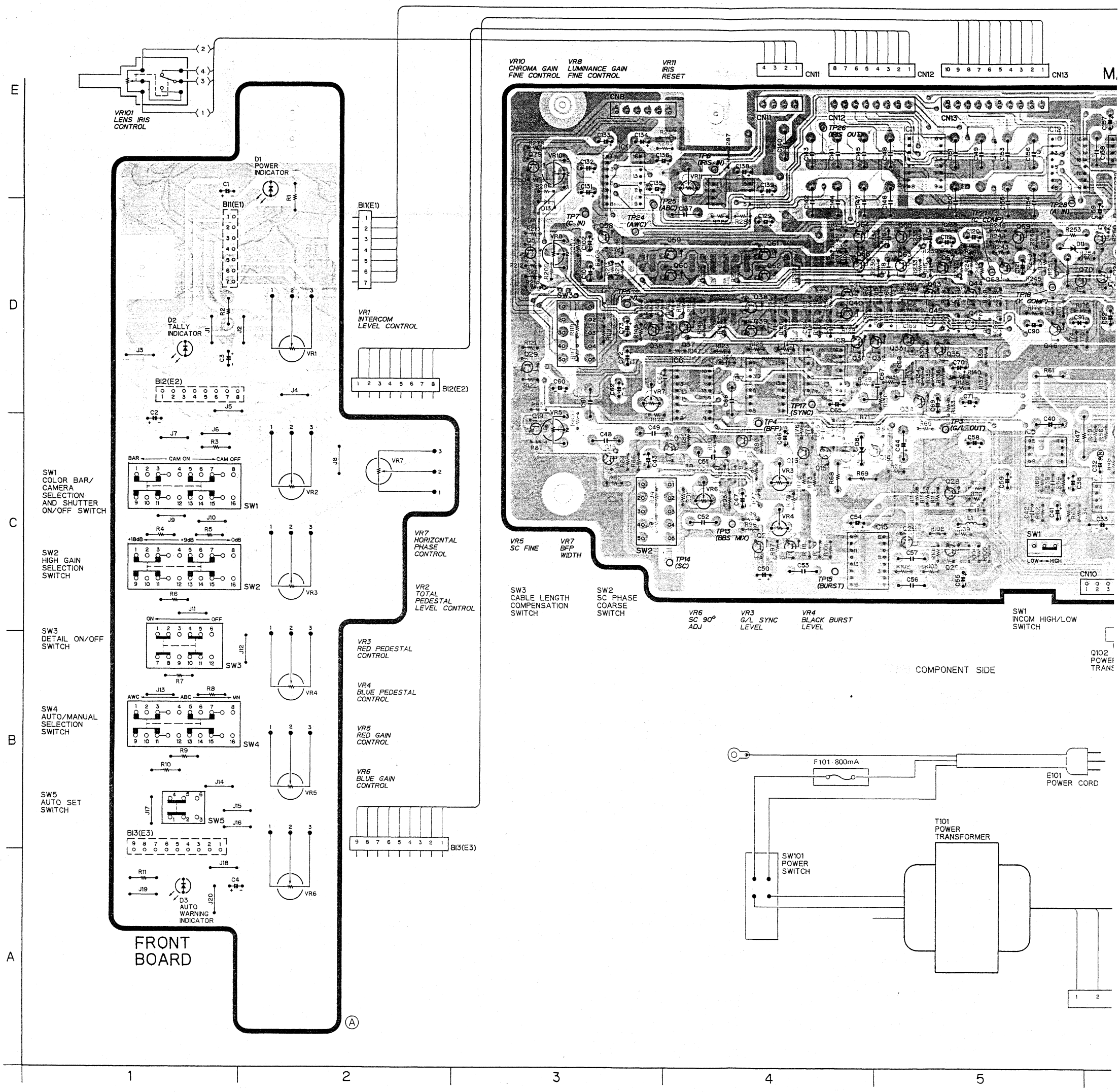
Q72	D6
Q73	D6
Q74	D6
Q75	D6
Q76	D6
Q77	D6
Q78	D6
Q79	E3
Q80	E6
Q81	E6
Q82	E6
D2	B6
D3	B7
D4	B6
D5	B6
D6	B6
D7	B6
D8	C4
D9	D6
D10	D7
D11	D5
D12	D6
D13	D3
D14	E6
Q101	B8
Q102	B6

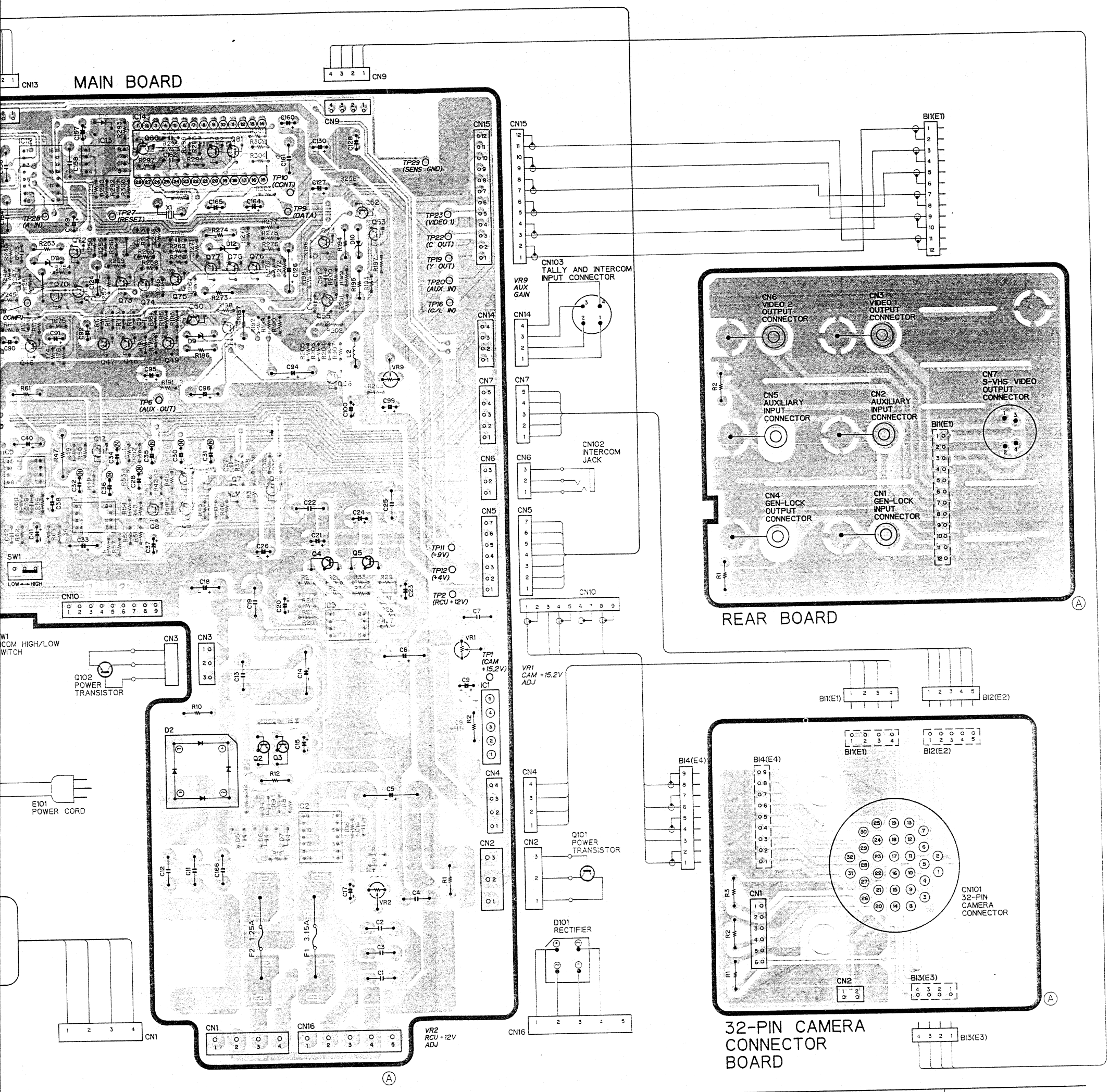
Front Board

D1	E2
D2	D1
D3	A1

CONDUCTOR VIEW OF REMOTE CO



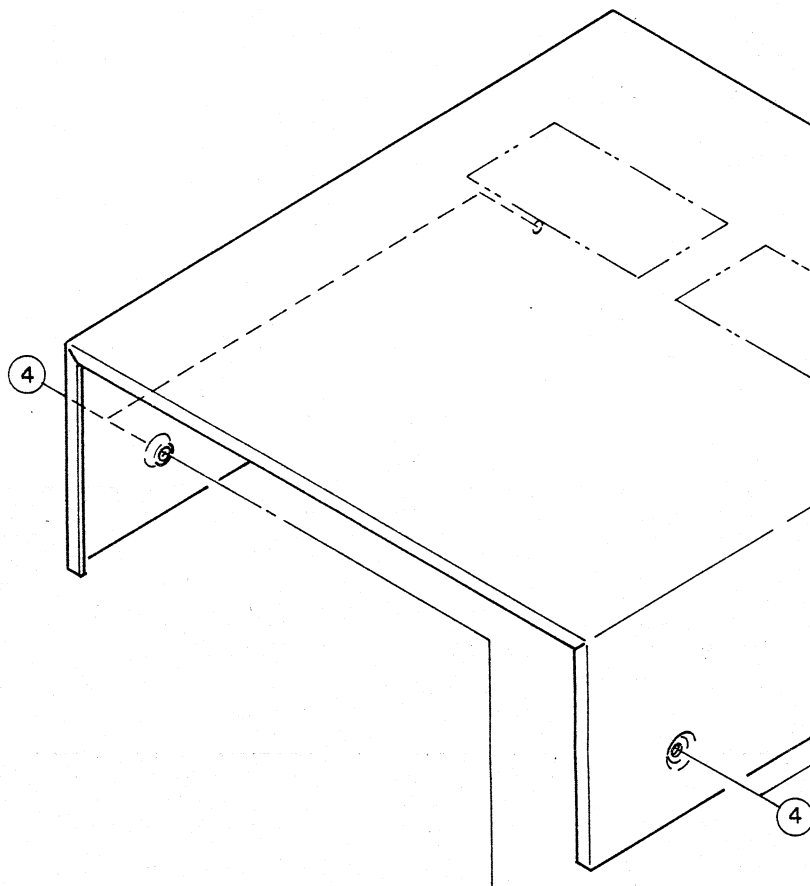
TE CONTROL UNIT WV-RC37

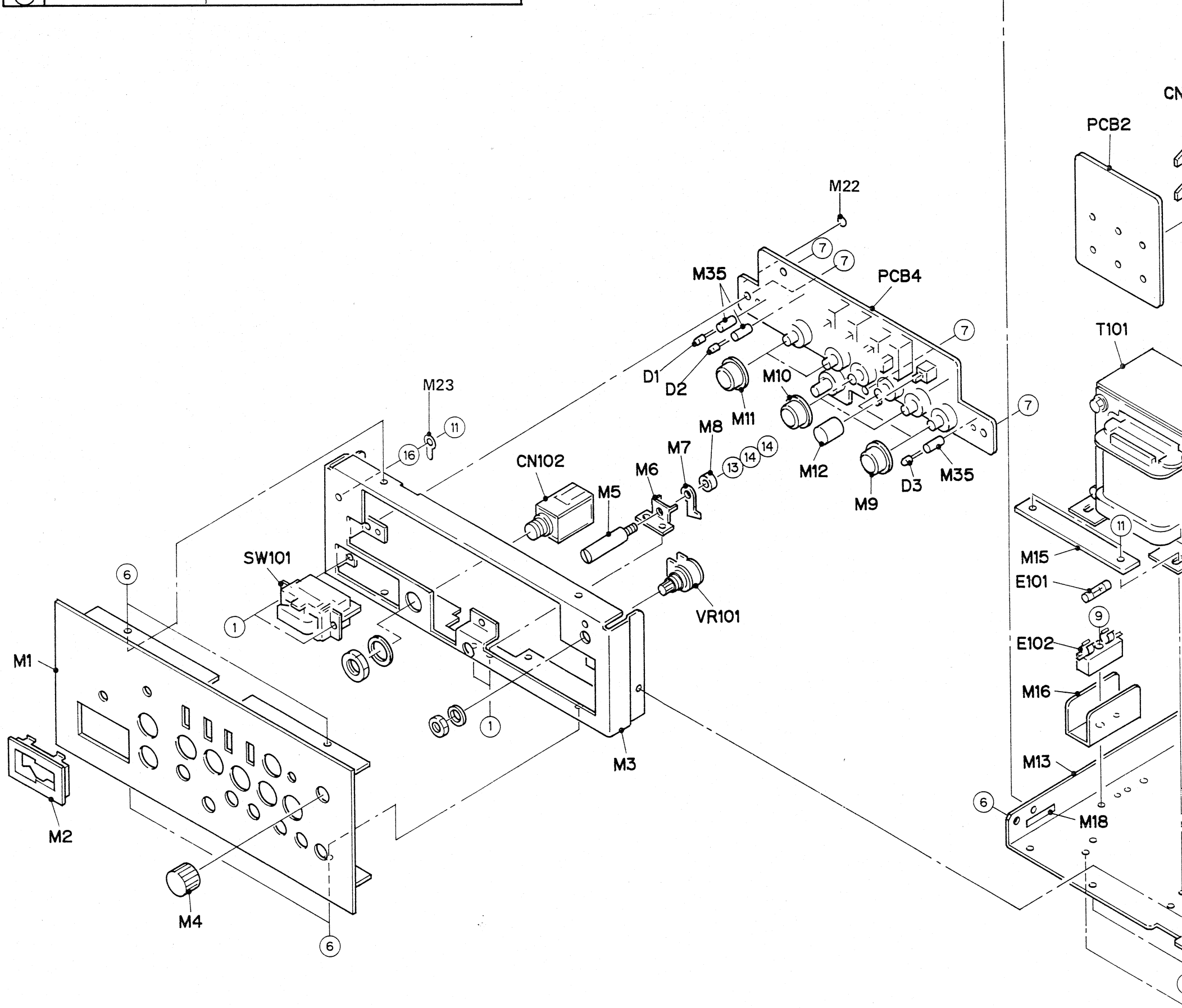


EXPLODED VIEW OF REMOTE CONT

○ Numbers show screws.

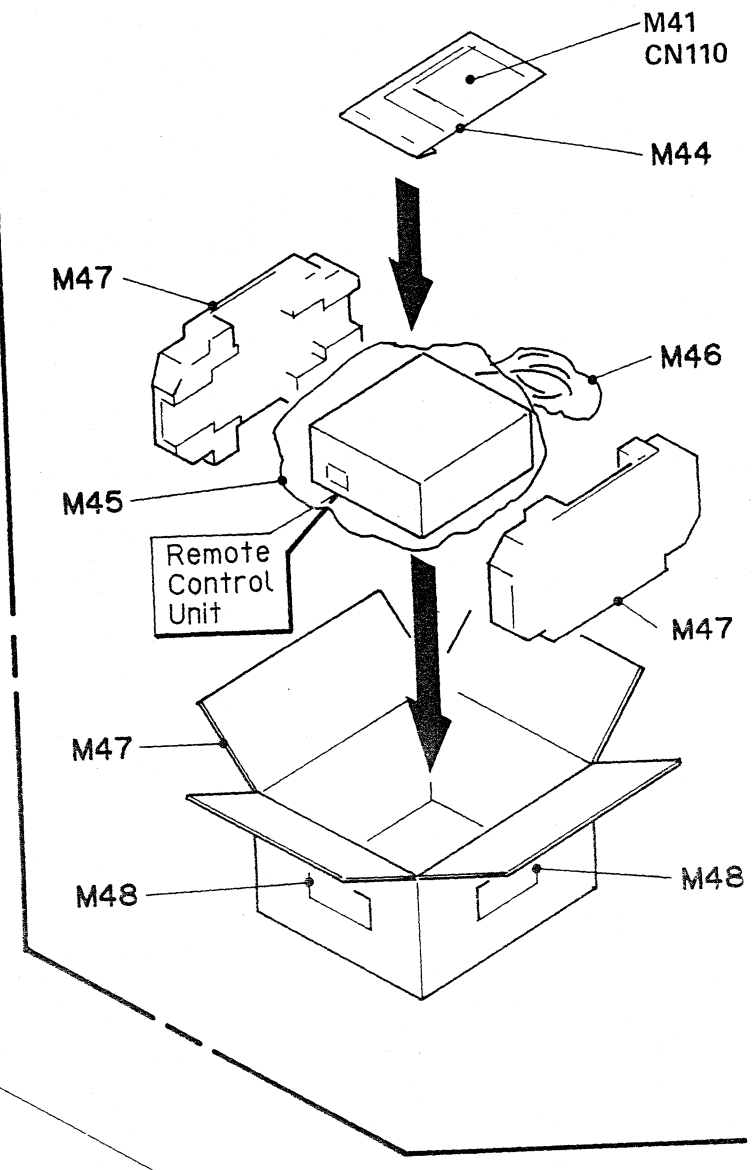
No.	Screws	Description
(1)	XSB3 + 6FX	Binding Head Screws
(2)	XSB3 + 10FX	Binding Head Screws
(3)	XSB3 + 6FXV	Binding Head Violet Screws
(4)	XTB3 + 6FFZ	Binding Head Tapping Screws
(5)	XTB3 + 4FFX	Binding Head Tapping Screws
(6)	XTB3 + 6FFX	Binding Head Tapping Screws
(7)	XTB3 + 6FFXV	Binding Head Tapping Violet Screws
(8)	XTB3 + 12FFXK	Binding Head Tapping Black Screws
(9)	XTN3 + 8FFXK	Pan Head Tapping Black Screws
(10)	XTN3 + 10BFZ	Pan Head Tapping Screws
(11)	XSB4 + 6FX	Binding Head Screws
(12)	XSB4 + 16FX	Binding Head Screws
(13)	XWE3FX	Small Round Head Nuts
(14)	XNG3E	Hexagon Head Nuts
(15)	XWC3BFN	External Toothed Lock Washer
(16)	XWC4BFN	External Toothed Lock Washer
(17)		
(18)		
(19)		
(20)		

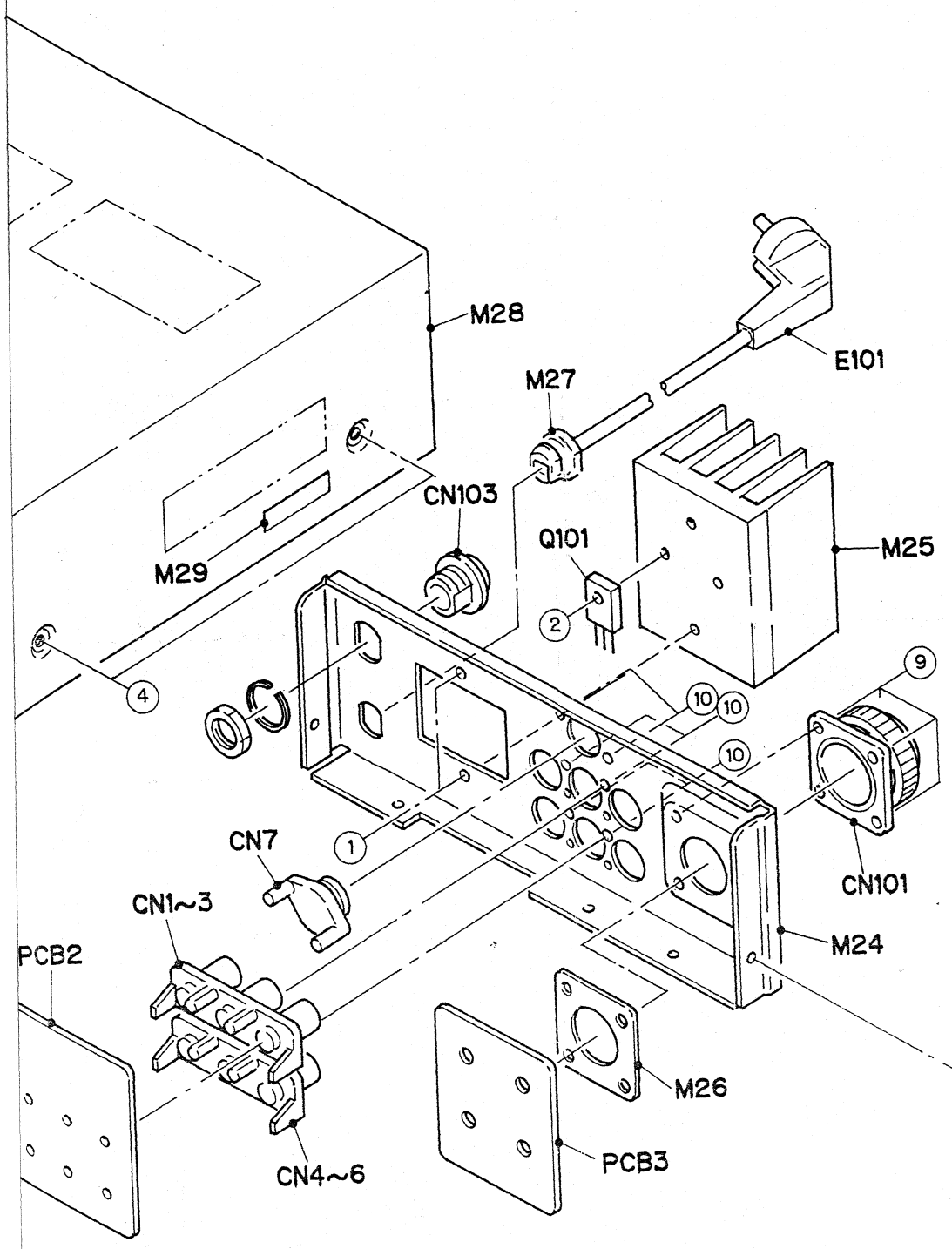


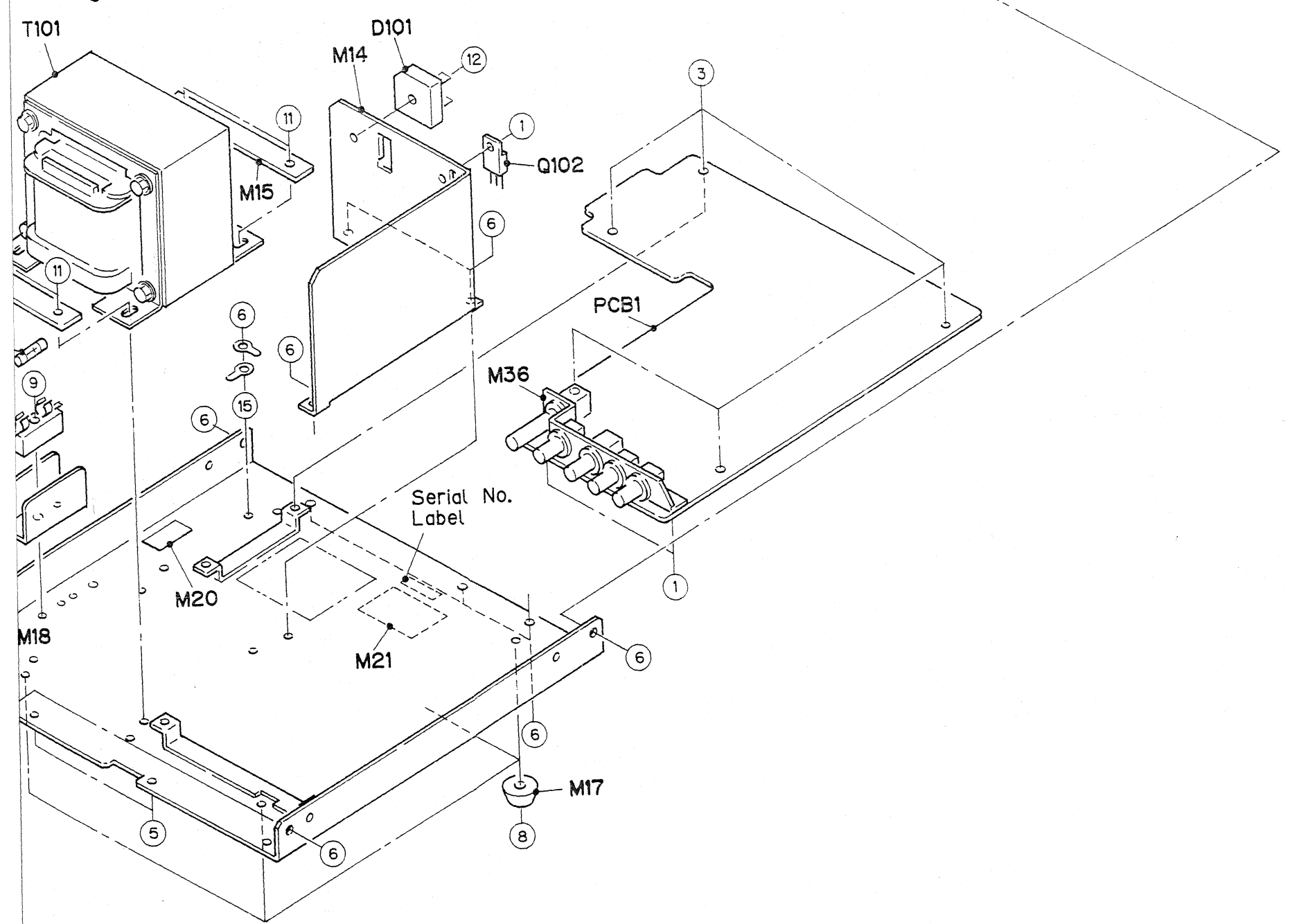


CONTROL UNIT WV-RC37

PACKAGING

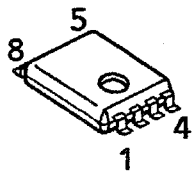




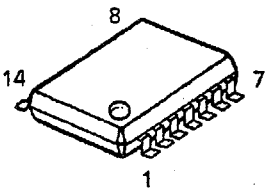


APPEARANCE OF IC, TRANSISTOR AND DIODE

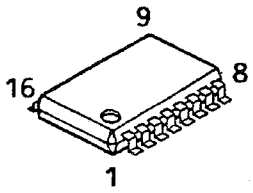
NJM2904M
NJM386M
TL092CPS
TL7700CPS



MN4011BS
MN4538BS
NJM723M



MN4051BSAW
MN4053BS
MN4538BS



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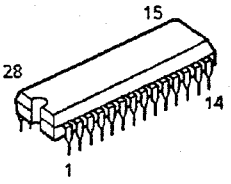

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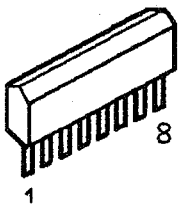

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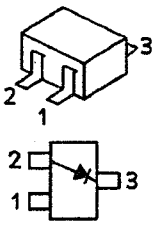

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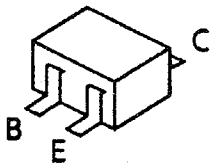
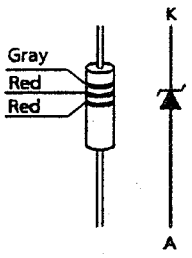
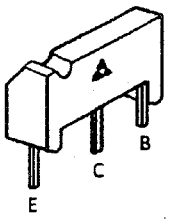
2SC2404-CD
2SD601-RS
2SD602-QRS



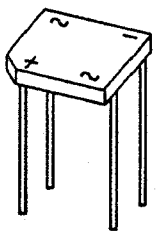
MA4082L



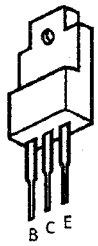
2SB793A-RS
2SD973A-RS



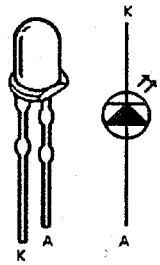
S15VB20
S4VB20



2SB941-PQR
2SB1057-PQ



LN21RPH
LN31GPH



REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
2. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

REF.NO.	PART NO.	DESCRIPTION
MISCELLANEOUS		
Q101	2SB1057-PQ	Transistor
Q102	2SB941-PQR	Transistor
D101	S15VB20	Diode
VR101	EVHC0HK20B14	Variable Resistor 10K ohms
T101 ⚠	YWPHB76V047	Power Transformer
SW101	YWEST15147V	Power Switch
F1 ⚠	XBA2C08ET0A	Current Fuse 0.8A 250V
F2 ⚠	XBA2C12ET0A	Current Fuse 1.2A 250V
F101 ⚠	XBA2C31ET0A	Current Fuse 3.15A 250A
CN102	YWLJ194-1-1	Intercom Jack
CN103	YFCNR-1204J	Tally/Intercom Connector
E101	YWKPGTSA-3	AC Power Cord for WV-RC37/A
	YWHBS-3-08	AC Power Cord for WV-RC37/B
	YWC0309-08F	AC Power Cord for WV-RC37/C
	YWVM0309-08	AC Power Cord for WV-RC37/G
E102	YWX-N1153-07	Fuse Holder
M1	YWV5WA1013B2	Front Panel
M2	YWV5EA0765A3	Power Switch Cover
M3	YWV2KA0548A2	Front Chassis
M4	YFV5RA0012A3	Iris Knob
M5	YFV4HA0011A4	Lock Shaft
M6	YWJ500PAM02B	Lock Angle
M7	YWJ500PAM01	Mounting Angle for Terminal
M8	YWJ500PWB01A	Rubber Cushion
M9	YFV5RC0004A4	GAIN Knob(Blue)
M10	YFV5RB0004A4	GAIN Knob(Red)
M11	YWV3801HR01	GAIN Knob(Black)
M12	YFV6JA0036B4	Push Button
M13	YWV2KA0547A2	Bottom Chassis
M14	YWV2HA0764A3	Shield Plate for Transformer
M15	YWV2CA0290A4	Hold Plate for Transformer
M16	YWV2PA0220A4	Insulator for Fuse
M17	YWV5350WB01	Rubber Foot
M18	YWV7MA0337A4	Fuse Rated Label
M20	YWV7MA0334A4	Fuse Label
M21 ⚠	YWV7QA2007A4	Main Label for WV-RC37/A
	YWV7QA2008A4	Main Label for WV-RC37/B
	YWV7QA2009A4	Main Label for WV-RC37/C
	YWV7QA2010A4	Main Label for WV-RC37/G
M22	YW-BCG-UR01B	L,N Earth Label
M23	YW-BCG-EM01	Earth Lug
M24	YWV5WA1012A3	Rear Panel
M25	YWV7DA0240A3	Heat Sink
M26	YWV2PA0221A4	Insulator for Connector
M27	YWSR6W1	Cord Clamp
M28	YWV5EB0387A2	Upper Cover
M29	YFV7MA0099A4	UL Caution Label
MAIN BOARD		
PCB1 (NLA)	YWVKBRC37E1A	Printed Circuit Board Assy
IC1	YWM5231TL	IC
IC2	NJM723M	IC
IC3,4	NJM2904M	IC
IC5	NJM386M	IC
IC6,7	MN4538BS	IC
IC8	MN4011BS	IC
IC9	MN4538BS	IC
IC10	TL092CPS	IC
IC11,12	MN4051BS	IC
IC13	TL7700CPS	IC
IC14	M46015	IC
IC15	MN4053BS	IC
Q2	2SB793A-RS	Transistor
Q3	2SD973A-RS	Transistor
Q4	2SB793A-RS	Transistor
Q5	2SD973A-RS	Transistor
Q6	2SB709-RS	Transistor
Q7	2SD602-QRS	Transistor
Q8-11	2SD601-RS	Transistor
Q12-14	2SD602-QRS	Transistor
Q15-23	2SC2404-CD	Transistor
Q25,26	2SC2404-CD	Transistor
Q28	2SC2404-CD	Transistor
Q29	2SD602-QRS	Transistor
Q30	2SC2404-CD	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q32	2SA1022-C	Transistor	
Q33-35	2SC2404-CD	Transistor	
Q36-49	2SD601-RS	Transistor	
Q50-53	2SD602-QRS	Transistor	
Q54-70	2SD601-RS	Transistor	
Q71,72	2SD602-QRS	Transistor	
Q73-76	2SD601-RS	Transistor	
Q77,78	2SD602-QRS	Transistor	
Q79	2SD601-RS	Transistor	
Q80	2SB709-RS	Transistor	
Q81,82	2SD601-RS	Transistor	
D2	S4VB20	Diode	
D3-7	MA151K	Diode	
D8-12	MA4082L	Diode	
D13,14	MA151K	Diode	
R1	ERDS2TJ331	Carbon	330 ohms 1/4W
R2	ERDS2TJ471	Carbon	470 ohms 1/4W
R3	YF2116332JT	Carbon	3.3K ohms 1/16W
R5	YF2116203JT	Carbon	20K ohms 1/16W
R8,9	YF2116332JT	Carbon	3.3K ohms 1/16W
R10	ERDS2TJ331	Carbon	330 ohms 1/4W
R11	YF2116682JT	Carbon	6.8K ohms 1/16W
R12	ERDS2TJ151	Carbon	150 ohms 1/4W
R13	YF2116272JT	Carbon	2.7K ohms 1/16W
R14	YF2116222GT	Carbon	2.2K ohms 1/16W
R15	YF2116103JT	Carbon	10K ohms 1/16W
R16	YF2116332JT	Carbon	3.3K ohms 1/16W
R17	YF2116302GT	Carbon	3K ohms 1/16W
R18	YF2116102GT	Carbon	1K ohms 1/16W
R19	YF2116472GT	Carbon	4.7K ohms 1/16W
R20-22	YWR1220P103D	Metal	10K ohms
R24	YFR1220P203D	Metal	20K ohms
R25,26	YF2116102GT	Carbon	1K ohms 1/16W
R27	YFR1220P203D	Metal	20K ohms
R28,29	YWR1220P103D	Metal	10K ohms
R31	YWR1220P303D	Metal	30K ohms
R33,34	YF2116102GT	Carbon	1K ohms 1/16W
R35	YF2116562JT	Carbon	5.6K ohms 1/16W
R36	YF2116223JT	Carbon	22K ohms 1/16W
R37	YF2116104JT	Carbon	100K ohms 1/16W
R38	YF2116562JT	Carbon	5.6K ohms 1/16W
R39	YF2116103JT	Carbon	10K ohms 1/16W
R40	YF2116333GT	Carbon	33K ohms 1/16W
R41,42	YF2116472GT	Carbon	4.7K ohms 1/16W
R43	YF2116103JT	Carbon	10K ohms 1/16W
R44	YF2116391JT	Carbon	390 ohms 1/16W
R45,46	YF2116331JT	Carbon	330 ohms 1/16W
R47	ERD25FJ271	Carbon	270 ohms 1/2W
R48	YF2116333GT	Carbon	33K ohms 1/16W
R49	YF2116393GT	Carbon	39K ohms 1/16W
R50	YF2116332JT	Carbon	3.3K ohms 1/16W
R51-53	YF2116102GT	Carbon	1K ohms 1/16W
R54	YF2116104JT	Carbon	100K ohms 1/16W
R55,56	YF2116103JT	Carbon	10K ohms 1/16W
R57	YF2116223JT	Carbon	22K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R58	YF2116103JT	Carbon	10K ohms 1/16W
R59,60	YF2116472GT	Carbon	4.7K ohms 1/16W
R61	ERDS2TJ101	Carbon	100 ohms 1/4W
R62	YF2116102GT	Carbon	1K ohms 1/16W
R63	YF2116101JT	Carbon	100 ohms 1/16W
R64	YF2116102GT	Carbon	1K ohms 1/16W
R65	YF2116750JT	Carbon	75 ohms 1/16W
R66	YF2116223JT	Carbon	22K ohms 1/16W
R67	YF2116181JT	Carbon	180 ohms 1/16W
R68,69	ERDS2TJ330	Carbon	33 ohms 1/4W
R70	YF2116222GT	Carbon	2.2K ohms 1/16W
R71	YW2116182JT	Carbon	1.8K ohms 1/16W
R72	YF2116100JT	Carbon	10 ohms 1/16W
R73	YF2116562JT	Carbon	5.6K ohms 1/16W
R74	YF2116152JT	Carbon	1.5K ohms 1/16W
R75	YF2116272JT	Carbon	2.7K ohms 1/16W
R76	YF2116152JT	Carbon	1.5K ohms 1/16W
R77	YF2116471JT	Carbon	470 ohms 1/16W
R78	YF2116391JT	Carbon	390 ohms 1/16W
R79	YF2116152JT	Carbon	1.5K ohms 1/16W
R80	YF2116273GT	Carbon	27K ohms 1/16W
R81	YF2116103JT	Carbon	10K ohms 1/16W
R82	YF2116152JT	Carbon	1.5K ohms 1/16W
R83	YF2116181JT	Carbon	180 ohms 1/16W
R84,85	YF2116561JT	Carbon	560 ohms 1/16W
R86	YF2116822JT	Carbon	8.2K ohms 1/16W
R87	YF2116392JT	Carbon	3.9K ohms 1/16W
R88	YF2116152JT	Carbon	1.5K ohms 1/16W
R89	YF2116271JT	Carbon	270 ohms 1/16W
R90,91	YF2116561JT	Carbon	560 ohms 1/16W
R92	YF2116822JT	Carbon	8.2K ohms 1/16W
R93	YF2116392JT	Carbon	3.9K ohms 1/16W
R94	YF2116151JT	Carbon	150 ohms 1/16W
R95	YF2116221JT	Carbon	220 ohms 1/16W
R96	YF2116152JT	Carbon	1.5K ohms 1/16W
R97	YF2116101JT	Carbon	100 ohms 1/16W
R98,99	YF2116561JT	Carbon	560 ohms 1/16W
R100	YF2116822JT	Carbon	8.2K ohms 1/16W
R101	YF2116392JT	Carbon	3.9K ohms 1/16W
R102	YF2116102GT	Carbon	1K ohms 1/16W
R103	YF2116272JT	Carbon	2.7K ohms 1/16W
R104	YF2116682JT	Carbon	6.8K ohms 1/16W
R105	YF2116222GT	Carbon	2.2K ohms 1/16W
R106	YF2116471JT	Carbon	470 ohms 1/16W
R108	YF2116102GT	Carbon	1K ohms 1/16W
R109	YF2116331JT	Carbon	330 ohms 1/16W
R110	YF2116151JT	Carbon	150 ohms 1/16W
R112	YF2116222GT	Carbon	2.2K ohms 1/16W
R113	YF2116101JT	Carbon	100 ohms 1/16W
R114	YF2116473GT	Carbon	47K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R115	YF2116223JT	Carbon	22K ohms 1/16W
R117-120	YF2116473GT	Carbon	47K ohms 1/16W
R121,122	YF2116103JT	Carbon	10K ohms 1/16W
R123,124	YF2116822JT	Carbon	8.2K ohms 1/16W
R125	YF2116473GT	Carbon	47K ohms 1/16W
R126	YF2116512JT	Carbon	5.1K ohms 1/16W
R128	YF2116472GT	Carbon	4.7K ohms 1/16W
R129	YF2116103JT	Carbon	10K ohms 1/16W
R130	YF2116472GT	Carbon	4.7K ohms 1/16W
R131	YF2116224JT	Carbon	220K ohms 1/16W
R132	YF2116102GT	Carbon	1K ohms 1/16W
R133	YF2116101JT	Carbon	100 ohms 1/16W
R134	YF2116332JT	Carbon	3.3K ohms 1/16W
R135	YF2116152JT	Carbon	1.5K ohms 1/16W
R136	YF2116102GT	Carbon	1K ohms 1/16W
R137	YF2116101JT	Carbon	100 ohms 1/16W
R138	YF2116103JT	Carbon	10K ohms 1/16W
R139	YF2116223JT	Carbon	22K ohms 1/16W
R140	YF2116103JT	Carbon	10K ohms 1/16W
R141	YF2116750JT	Carbon	75 ohms 1/16W
R142	YF2116273GT	Carbon	27K ohms 1/16W
R143	YF2116103JT	Carbon	10K ohms 1/16W
R144	YF2116101JT	Carbon	100 ohms 1/16W
R145	YF2116821GT	Carbon	820 ohms 1/16W
R146	YF2116221JT	Carbon	220 ohms 1/16W
R147	YF2116472GT	Carbon	4.7K ohms 1/16W
R148	YF2116122JT	Carbon	1.2K ohms 1/16W
R149	YF2116103JT	Carbon	10K ohms 1/16W
R150	YF2116102GT	Carbon	1K ohms 1/16W
R153	YF2116223JT	Carbon	22K ohms 1/16W
R154	YF2116162JT	Carbon	1.6K ohms 1/16W
R156	YF2116223JT	Carbon	22K ohms 1/16W
R157	YF2116562JT	Carbon	5.6K ohms 1/16W
R158	YF2116473GT	Carbon	47K ohms 1/16W
R159	YF2116223JT	Carbon	22K ohms 1/16W
R160	YF2116332JT	Carbon	3.3K ohms 1/16W
R161	YF2116333GT	Carbon	33K ohms 1/16W
R162	YF2116223JT	Carbon	22K ohms 1/16W
R163	YF2116751JT	Carbon	750 ohms 1/16W
R164	YF2116681JT	Carbon	680 ohms 1/16W
R165	YF2116621JT	Carbon	620 ohms 1/16W
R166	YF2116561JT	Carbon	560 ohms 1/16W
R167-170	YF2116223JT	Carbon	22K ohms 1/16W
R171	YF2116471JT	Carbon	470 ohms 1/16W
R172	YF2116121JT	Carbon	120 ohms 1/16W
R173	YF2116122JT	Carbon	1.2K ohms 1/16W
R174	YWR1220P273D	Metal	27K ohms
R175	YWR1220P103D	Metal	10K ohms
R176	YF2116101JT	Carbon	100 ohms 1/16W
R177,178	R1220P821D	Metal	820 ohms
R179	YWR1220P272D	Metal	2.7K ohms
R180	YWR1220P152D	Metal	1.5K ohms
R181	YWR1220P562D	Metal	5.6K ohms
R182	YWR1220P152D	Metal	1.5K ohms
R183	YF2116100JT	Carbon	10 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R184	YF2116103JT	Carbon	10K ohms 1/16W
R185	YF2116222GT	Carbon	2.2K ohms 1/16W
R186,187	ERDS2TJ330	Carbon	33 ohms 1/4W
R188	YF2116181JT	Carbon	180 ohms 1/16W
R189	YF2116223JT	Carbon	22K ohms 1/16W
R190,191	YF2116750JT	Carbon	75 ohms 1/16W
R192	YF2116223JT	Carbon	22K ohms 1/16W
R193	YF2116181JT	Carbon	180 ohms 1/16W
R194,195	ERDS2TJ330	Carbon	33 ohms 1/4W
R196	YF2116222GT	Carbon	2.2K ohms 1/16W
R197	YF2116103JT	Carbon	10K ohms 1/16W
R198	YF2116100JT	Carbon	10 ohms 1/16W
R199	YF2116562JT	Carbon	5.6K ohms 1/16W
R200	YF2116152JT	Carbon	1.5K ohms 1/16W
R201	YF2116272JT	Carbon	2.7K ohms 1/16W
R202	YF2116152JT	Carbon	1.5K ohms 1/16W
R203	YF2116561JT	Carbon	560 ohms 1/16W
R204	YF2116821GT	Carbon	820 ohms 1/16W
R205	YF2116273GT	Carbon	27K ohms 1/16W
R206	YF2116103JT	Carbon	10K ohms 1/16W
R207	YF2116750JT	Carbon	75 ohms 1/16W
R208	YF2116273GT	Carbon	27K ohms 1/16W
R209	YF2116103JT	Carbon	10K ohms 1/16W
R210	YF2116101JT	Carbon	100 ohms 1/16W
R211	YF2116821GT	Carbon	820 ohms 1/16W
R212	YF2116101JT	Carbon	100 ohms 1/16W
R213	YF2116472GT	Carbon	4.7K ohms 1/16W
R214	YF2116122JT	Carbon	1.2K ohms 1/16W
R215	YF2116103JT	Carbon	10K ohms 1/16W
R216	YF2116102GT	Carbon	1K ohms 1/16W
R219,222	YF2116223JT	Carbon	22K ohms 1/16W
R225,228	YF2116223JT	Carbon	22K ohms 1/16W
R229	YF2116162JT	Carbon	1.6K ohms 1/16W
R230	YF2116132JT	Carbon	1.3K ohms 1/16W
R231	YF2116112JT	Carbon	1.1K ohms 1/16W
R232	YF2116911JT	Carbon	910 ohms 1/16W
R233-236	YF2116223JT	Carbon	22K ohms 1/16W
R237	YF2116471JT	Carbon	470 ohms 1/16W
R238	YF2116121JT	Carbon	120 ohms 1/16W
R239	YF2116122JT	Carbon	1.2K ohms 1/16W
R240	YWR1220P273D	Metal	27K ohms
R241	YWR1220P103D	Metal	10K ohms
R242	YF2116101JT	Carbon	100 ohms 1/16W
R243,244	R1220P821D	Metal	820 ohms
R245	YWR1220P272D	Metal	2.7K ohms
R246	YWR1220P152D	Metal	1.5K ohms
R247	YWR1220P562D	Metal	5.6K ohms
R248	YWR1220P152D	Metal	1.5K ohms
R249	YF2116100JT	Carbon	10 ohms 1/16W
R250	YF2116103JT	Carbon	10K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R251	YF2116222GT	Carbon	2.2K ohms 1/16W
R252,253	ERDS2TJ330	Carbon	33 ohms 1/4W
R254	YF2116181JT	Carbon	180 ohms 1/16W
R255	YF2116223JT	Carbon	22K ohms 1/16W
R256	YF2116750JT	Carbon	75 ohms 1/16W
R257,258	YF2116101JT	Carbon	100 ohms 1/16W
R259,260	R1220P821D	Metal	820 ohms
R261,263	YWR1220P561D	Metal	560 ohms
R265	YWR1220P272D	Metal	2.7K ohms
R266	YWR1220P152D	Metal	1.5K ohms
R267	YWR1220P562D	Metal	5.6K ohms
R268	YWR1220P152D	Metal	1.5K ohms
R269	YF2116151JT	Carbon	150 ohms 1/16W
R270	YF2116100JT	Carbon	10 ohms 1/16W
R271	YF2116103JT	Carbon	10K ohms 1/16W
R272	YF2116222GT	Carbon	2.2K ohms 1/16W
R273,274	ERDS2TJ330	Carbon	33 ohms 1/4W
R275	YF2116181JT	Carbon	180 ohms 1/16W
R276	YF2116223JT	Carbon	22K ohms 1/16W
R277,278	YF2116750JT	Carbon	75 ohms 1/16W
R279	YF2116103JT	Carbon	10K ohms 1/16W
R280,281	YF2116222GT	Carbon	2.2K ohms 1/16W
R282,283	YW2116105JT	Carbon	1M ohms 1/16W
R286	YWR1220P752D	Metal	7.5K ohms
R287	YFR1220P113D	Metal	11K ohms
R288	YFR1220P203D	Metal	20K ohms
R290	YWR1220P303D	Metal	30K ohms
R291,292	YWR1220P202D	Metal	2K ohms
R293,294	YF2116103JT	Carbon	10K ohms 1/16W
R295	YF2116104JT	Carbon	100K ohms 1/16W
R296	YF2116102GT	Carbon	1K ohms 1/16W
R297	YF2116563JT	Carbon	56K ohms 1/16W
R298	YF2116102GT	Carbon	1K ohms 1/16W
R299	YF2116561JT	Carbon	560 ohms 1/16W
R300	YF2116332JT	Carbon	3.3K ohms 1/16W
R301,302	YF2116103JT	Carbon	10K ohms 1/16W
R303,304	YF2116152JT	Carbon	1.5K ohms 1/16W
R306	YF2116332JT	Carbon	3.3K ohms 1/16W
R307	YF2116101JT	Carbon	100 ohms 1/16W
VR1	EVM8AGA00B53	Variable Resistor	6.8K ohms
VR2	YWH0621A1K	Variable Resistor	1K ohms
VR3	YWH0621A4R7K	Variable Resistor	4.7K ohms
VR4	YWH0621A1K	Variable Resistor	1K ohms
VR5	YWK0971101KB	Variable Resistor	1K ohms
VR6	YWH0621A1K	Variable Resistor	1K ohms
VR7	YWH0621A4R7K	Variable Resistor	4.7K ohms
VR8	YWK09711500B	Variable Resistor	500 ohms
VR9	YFH0621A470K	Variable Resistor	470K ohms
VR10	YWK0971101KB	Variable Resistor	1K ohms
VR11	YWH0621A4R7K	Variable Resistor	4.7K ohms
C1-3	ECKD2H103KB	Ceramic	0.01 µF 500V
C4	ECQV1H104JZ	Plastic	0.1 µF 50V
C5	ECOS1EG153T	Electrolytic	0.015 µF 25V
C6	ECEA1EGE472	Electrolytic	4700 µF 25V
C7	ECQV1H104JZ	Plastic	0.1 µF 50V

REF.NO.	PART NO.	DESCRIPTION	
C8	YF400102XKT	Ceramic	1000 pF
C9	-ECEA1HKA010	Electrolytic	1 µF 50V
C11,12	ECKD2H103KB	Ceramic	0.01 µF 500V
C13	ECQV1H104JZ	Plastic	0.1 µF 50V
C14	ECEA1EGE472	Electrolytic	4700 µF 25V
C15	-ECEA1EKA330	Electrolytic	33 µF 25V
C16	YF400102XKT	Ceramic	1000 pF
C17	-ECEA1EKA100	Electrolytic	10 µF 25V
C18	ECEA1CU222	Electrolytic	2200 µF 16V
C19	ECQV1H104JZ	Plastic	0.1 µF 50V
C20	ECEA1CKS470	Electrolytic	47 µF 16V
C21	ECEA1CKA101	Electrolytic	100 µF 16V
C22	ECQV1H104JZ	Plastic	0.1 µF 50V
C23	ECEA1CKS470	Electrolytic	47 µF 16V
C24	ECEA1AKA101	Electrolytic	100 µF 10V
C25	ECQV1H104JZ	Plastic	0.1 µF 50V
C26	ECEA1CKA101	Electrolytic	100 µF 16V
C27	YF400102XKT	Ceramic	1000 pF
C28	ECEA1CKN100	Electrolytic	10 µF 16V
C29	YF400472XKT	Ceramic	4700 pF
C30-32	ECEA1CKN100	Electrolytic	10 µF 16V
C33	ECEA1CU471	Electrolytic	470 µF 16V
C34-36	ECEA1CKN100	Electrolytic	10 µF 16V
C37	ECEA1AKA101	Electrolytic	100 µF 10V
C38	ECEA1HKA0R1	Electrolytic	0.1 µF 50V
C39	YF400103XKT	Ceramic	0.01 µF
C40	ECEA1CU471	Electrolytic	470 µF 16V
C41	ECEA1EKA470	Electrolytic	47 µF 16V
C42	YF400103XKT	Ceramic	0.01 µF
C43	ECEA1CKS470	Electrolytic	47 µF 16V
C44	ECEA1CU222	Electrolytic	2200 µF 16V
C45	YF400300CHJT	Ceramic	30 pF
C46	ECEA1AKA221	Electrolytic	220 µF 10V
C47	ECEA1AKA101	Electrolytic	100 µF 10V
C48	ECQP1H101JZ	Plastic	100P 50V
C49	ECQB1H103JZ	Plastic	0.01 µF 50V
C50	ECEA1CKS470	Electrolytic	47 µF 16V
C51	ECQP1H101JZ	Plastic	100 pF 50V
C52,53	ECQB1H103JZ	Plastic	0.01 µF 50V
C54	ECEA1CKS470	Electrolytic	47 µF 16V
C55	ECEA1AKS330	Electrolytic	33 µF 10V
C56,57	ECQV1H104JZ	Plastic	0.1 µF 50V
C58	ECEA1AKA101	Electrolytic	100 µF 10V
C59,60	ECEA1CKS470	Electrolytic	47 µF 16V
C61	ECQV1H104JZ	Plastic	0.1 µF 50V
C62	ECEA1CKS470	Electrolytic	47 µF 16V
C63,64	YF400331CHJT	Ceramic	330 PF
C65	ECEA1CKS470	Electrolytic	47 µF 16V
C66	ECQP1H102JZ	Plastic	1000 pF 50V
C67	ECQP1H101JZ	Plastic	100 pF 50V

REF.NO.	PART NO.	DESCRIPTION
C68	ECQV1H104JZ	Plastic 0.1 µF 50V
C69	ECEA1AKS330	Electrolytic 33 µF 10V
C70	ECEA1CKS470	Electrolytic 47 µF 16V
C71	ECEA1AKA101	Electrolytic 100 µF 10V
C72	ECEA1CKS470	Electrolytic 47 µF 16V
C73	ECEA1AKS470	Electrolytic 47 µF 10V
C77,79	YF400060CHDT	Ceramic 6 pF
C80	YF400150CHJT	Ceramic 15 pF
C81	YF400101CHJT	Ceramic 100 pF
C82	YF400150CHJT	Ceramic 15 pF
C83	YF400300CHJT	Ceramic 30 pF
C84	YF400121CHJT	Ceramic 120 pF
C85	YF400240CHJT	Ceramic 24 pF
C86-89	YF400102XKT	Ceramic 1000 pF
C90,91	ECEA1AKS470	Electrolytic 47 µF 10V
C92	ECEA1CKS470	Electrolytic 47 µF 16V
C93	YF400330CHJT	Ceramic 33 pF
C94	ECEA1CU472	Electrolytic 4700 µF 16V
C95	ECEA1CKS470	Electrolytic 47 µF 16V
C96	ECEA1CU222	Electrolytic 2200 µF 16V
C97	YF400300CHJT	Ceramic 30 pF
C98	YF400270CHJT	Ceramic 27 pF
C99	ECEA1AKS470	Electrolytic 47 µF 10V
C100,101	ECEA1CKS470	Electrolytic 47 µF 16V
C102	ECEA1AKS470	Electrolytic 47 µF 10V
C115-118	YF400102XKT	Ceramic 1000 pF
C119,120	ECEA1AKS470	Electrolytic 47 µF 10V
C121	ECEA1CKS470	Electrolytic 47 µF 16V
C123	YF400330CHJT	Ceramic 33 pF
C124	ECEA1CU222	Electrolytic 2200 µF 16V
C125	YF400300CHJT	Ceramic 30 pF
C126	ECEA1CU472	Electrolytic 4700 µF 16V
C127,128	ECEA1CKS470	Electrolytic 47 µF 16V
C129	ECEA1AKS470	Electrolytic 47 µF 10V
C130	ECEA1AKA101	Electrolytic 100 µF 10V
C131,132	ECEA1CKA100	Electrolytic 10 µF 16V
C133	ECEA1CKS470	Electrolytic 47 µF 16V
C134	ECEA1HKAR22	Electrolytic 0.22 µF 50V
C135	ECEA1CKA100	Electrolytic 10 µF 16V
C136	ECEA1HKAR22	Electrolytic 0.22 µF 50V
C137	ECQV1H104JZ	Plastic 0.1 µF 50V
C138,139	ECEA1CKS470	Electrolytic 47 µF 16V
C140-151	ECQV1H104JZ	Plastic 0.1 µF 50V
C153-156	ECQV1H104JZ	Plastic 0.1 µF 50V
C157	ECEA1CKS470	Electrolytic 47 µF 16V
C158	ECQV1H104JZ	Plastic 0.1 µF 50V
C159	ECEA1AKS470	Electrolytic 47 µF 10V
C160	ECEA1CKS470	Electrolytic 47 µF 16V
C161	ECQV1H104JZ	Plastic 0.1 µF 50V
C162	YF400151CHJT	Ceramic 150 pF
C163	YF400470CHJT	Ceramic 47 pF
C164,165	ECEA1AKA101	Electrolytic 100 µF 10V
C166	ECKD2H103KB	Ceramic 0.1 µF
C167	YW400131CHJT	Ceramic 130 pF
C168	ECCF1H510JC	Ceramic 51 pF 50V

REF.NO.	PART NO.	DESCRIPTION
C169	ECCF1H330JC	Ceramic 33 pF 50V
L1	ELEPL100KA	Coil 10 µH
L2	ELEPK470KA	Coil 47 µH
SW1	YWSSSS912L4	Slide Switch
SW2	YWSRBM24NS30	Rotary Switch
SW3	YWSRBM24NS15	Rotary Switch
X1	YFCSB500EG	Oscillator
J23,30	YF21160R00T	Jumper Resistor
J107,262	YF21160R00T	Jumper Resistor
J264,285	YF21160R00T	Jumper Resistor
J289	YF21160R00T	Jumper Resistor
CN1	YWB4PVH	4-pin Connector
CN2	YWB3PVH	3-pin Connector
CN3	EMCS0352M	3-pin Connector
CN4	EMCS0452M	4-pin Connector
CN5	EMCS0750Z	7-pin Connector
CN6	EMCS0350Z	3-pin Connector
CN7	EMCS0550Z	5-pin Connector
CN8	EMCS0650Z	6-pin Connector
CN9	EMCS0450Z	4-pin Connector
CN10	EMCS0950Z	9-pin Connector
CN11	EMCS0450Z	4-pin Connector
CN12	EMCS0850Z	8-pin Connector
CN13	EMCS1050Z	10-pin Connector
CN14	EMCS0450Z	4-pin Connector
CN15	EMCS1250Z	12-pin Connector
CN16	YWB5P-VH	5-pin Connector
E1	YWSN5053	Fuse Holder
E2	YVL437TM027	Terminal
E3	YW32BM10	Terminal
M36	YWV2SA1507A3	Mounting Angle for VR

REF.NO.	PART NO.	DESCRIPTION
REAR BOARD		
PCB2	YWVRARC37P1A	Printed Board
R1,2	ERDS2TJ750	Carbon 75 ohms 1/4W
CN1-3	YWP2195	BNC Connector Unit
CN4-6	YWP2196	BNC Connector Unit
E1	YWM1824	Terminal
E2	YVL437TM027	Terminal
32-PIN CAMERA CONNECTOR BOARD		
PCB3	YWVKDRC37P1A	Printed Board
R1-3	ERDS2TJ750	Carbon 75 ohms 1/4W
CN1	EMCS0650Z	6-pin Connector
CN2	EMCS0252M	2-pin Connector
CN101	YWJMBP2532FD	32-pin Connector
FRONT BOARD		
PCB4 (NLA)	YWVKZRC37P1A	Printed Circuit BoardAssy
D1	LN21RPH	LED Red
D2,3	LN31GPH	LED Green
R1	ERDS2TJ681	Carbon 680 ohms 1/4W
R2	ERDS2TJ561	Carbon 560 ohms 1/4W
R3-10	ERDS2TJ103	Carbon 10K ohms 1/4W
R11	ERDS2TJ561	Carbon 560 ohms 1/4W
VR1	YWK12G01KBNC	Variable Resistor 1K ohms
VR2-6	YFK12G10KBNC	Variable Resistor 10K ohms
VR7	EVJ1KAS10B14	Variable Resistor 10K ohms
C1	ECEA1CKS470	Electrolytic 47 µF 16V
C2-4	ECEA1AKS470	Electrolytic 47 µF 16V
SW1,2	YFSSA043L12	Slide Switch
SW3	YFSSA042L12	Slide Switch
SW4	YFSSA043L12	Slide Switch
SW5	YFSPH222A	Push Switch
M35	YWV2NA0295A4	LED Spacer

REF.NO.	PART NO.	DESCRIPTION
ACCESSORY PARTS/PACKAGING PARTS		
CN110	YFCNR-1204P	4-pin Connector
M41	YWV8QA1916AN	Operating Instructions
M44	XZB26X40C05	Polyethylene Bag
M45	XZB35X50C05	Polyethylene Bag
M46	YWT20X35C03	Polyethylene Bag
M47	YWV9CA1338AN	Packaging Assy